

# THE MEDICAL JOURNAL OF AUSTRALIA

VOL. II.—24TH YEAR.

SYDNEY, SATURDAY, AUGUST 7, 1937.

No. 6.

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### AN EPIDEMIOLOGICAL STUDY.<sup>1</sup>

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#### Epidemiology.

THE modern study of epidemiology began with the work of the English Hippocrates, Thomas Sydenham. "Nothing", he says (1666) in his chapter on epidemic diseases, "in my opinion strikes the mind that contemplates the whole and open domain of medicine with greater wonder than the well-known varied and inconsistent character of those diseases we call epidemic."

<sup>1</sup>This paper is based on the Bancroft Memorial Lecture which was delivered in Brisbane in 1935, but which was not published.

"It is not so much that they reflect and depend upon different conditions of climate in one and the same year as that they represent different and dissimilar constitutions of different and dissimilar years. The evident diversity of diseases is palpably shown both by the difference and the peculiarities of their symptoms and the variety of treatment that they require.

"There are different constitutions in different years. They originate neither in their heat nor their cold, their wet nor their drought, but they depend upon certain hidden and explicable changes in the bowels of the earth. By the effluvia from these" *et cetera*.

He recognized weather effects ("atmospheric temperament") and that some epidemics are regular and uniform in their behaviour. But other diseases were "excessively inconsistent, and due to the constitution of the year, and a specimen, as it were, of

Nature playing tricks, one and the same disease shall in a year of one and the same constitution exhibit itself in various and dissimilar effects as to its origin, its formation, its decline."

He classifies all epidemics into vernal or autumnal. Smallpox and plague "turn their back on the winter", cholera (August), dysentery and malaria are autumnal.

"Almost every constitution over and above the fevers it engenders has also a tendency to propagate along with it some second disease from the class of proper and typical epidemics, such as plague, smallpox, dysentery, etc. Moreover, and to this we must carefully attend, when several of these fevers ingest the same year, one has the ascendancy over the others. When the paramount complaint increases they decrease, when it loses ground they make way." The autumnal group is specially selected by him as determining the constitution for the year.

"Such leading epidemics as at the autumnal equinox devastate all things like torrents that have broken their banks and at the approach of the colds of winter retire within their channels, whilst the secondary maladies that serve like soldiers under them, take that very time for their development, and then they wax strong and take the lead until the paramount epidemic of the next year weakens their rigor and abolishes their name.

"The peculiar atmospheric diathesis produces the constitution, the particular constitution engenders a different species of each epidemic."

He therefore, realizing the difficulties, presented a study of the history and treatment of the epidemics of fifteen years 1661-1676.

"It is thus that I would add my mite, such as it is, towards the foundation of a work that, in my humble judgement, shall be beneficial to the human race. Posterity will complete it, since to them it shall be given to take the full view of the whole cycle of epidemics in their mutual sequences for years yet to come.

"I have remarked that if swarms of insects, especially house flies, were abundant in the summer, the succeeding autumn was unhealthy. At the approach of even so severe a disease as the plague itself they were not observed to be very abundant.

"Mere atmospheric constitution is by no means sufficient in and of itself to originate plague. Either the disease itself must continue to survive in some secret quarter or else either from some fomes or from the introduction from pestilential localities of an infected person it must have become extended."

In the Hippocratic collection books are devoted to the epidemics (first and third), in which the diseases experienced are grouped under the heading of constitutions in relation to meteorological conditions and season, together with illustrative cases.

In the main the allusion is to the seasonal prevalence or preference displayed by various diseases, together with the varying fatality at the different periods of the year.

Some of the diseases described by Hippocrates have definite seasonal behaviour, shown either in morbidity or mortality: mumps, malaria, phthisis, dysentery, ophthalmia, pneumonia, quinsy (? diphtheria); in others seasonal behaviour is not marked: puerperal sepsis, erysipelas, appendicitis, carbuncle, epilepsy.

In his book on airs, waters and places, Hippocrates lays down certain studies for every medical practitioner.

Whoever wishes to investigate medicine properly should proceed thus: in the first place to consider the seasons of the year and what effect each of them produces (for they are not all alike, but differ much from themselves in regard to their changes).

Then the winds, hot and cold . . . such as are peculiar to each locality . . . the qualities of the waters. . . When one comes to a city to which he is a stranger he ought to consider its situation, how it lies as to the winds and the rising of the sun . . . the ground, whether it be naked and dry or woody and well watered, and whether it lies in a hollow confined situation or is elevated and cold, and the mode in which the inhabitants live and what are their pursuits, whether they are fond of drinking and eating to excess and given to indolence or are fond of exercise and labour and not given to excess.

For if one knows all these things well he cannot miss knowing . . . either the disease peculiar to the place or the particular nature of common diseases . . . and in particular as the season and the year advances he can tell what epidemic will attack the city, either in summer and winter, and what each individual will be in danger from experiencing from the change of regimen.

Those which lie to the rising of the sun are likely to be more healthy . . . In the first place both the heat and cold are more moderate, such waters as flow to the rising sun must necessarily be clear, fragrant, soft and delightful to drink . . . The persons of the inhabitants are for the most part well coloured and blooming, unless some disease counteract. The inhabitants have clear voices, and in temper and intellect are superior . . . and all the productions of the country in like manner are better. A city so situated resembles the spring as to moderation between heat and cold, and the diseases are few in number . . . and bear a resemblance to the diseases which prevail in regions exposed to hot winds (diarrhoea rather than bronchitis, e.g.). The women there are very prolific.

Queensland is at present (1932) running neck and neck with South Australia for the lowest infantile mortality in Australia, and, barring New Zealand, the lowest in the world. Excepting Tasmania, it has the highest birth rate among married women at the reproductive age. The State possesses the lowest death rate in the world, except New Zealand, though the index of mortality, which allows for age variation of population, places it second to South Australia. As regards tuberculosis, the great disease of civilization and of the working period of life, Queensland is again the best country of the world. The decrease in the number of deaths from other forms of the disease not pulmonary has been quite phenomenal. Reduction of bovine tuberculosis plays here an important part. Healthier cattle and healthier milk are suggested as well as the benefits of sunshine. It is therefore in no unduly critical attitude that the debit side is also computed. The cancer figures are fairly satisfactory, Queensland improving on the Commonwealth average. Maternal mortality is less than the average—the next best to Western Australia—and the figures for puerperal

sepsis are the best among the States. The suicide rate seems unsatisfactory, especially in men, and the toll of accidental death is also unusually heavy on men. Typhoid fever has a heavier incidence, especially in the country, together with diarrhoea in older persons, whereas acute bronchitis, chronic bronchitis and the pneumonias are better than the Australian average. Liver conditions conform to the average, but the early incidence of nephritis is heavy, and the figures for nephritis are high, especially in women, while in chronic rheumatism and in diabetes Queensland shows to advantage. The deaths from appendicitis and from acute and chronic alcoholism are abnormal; these appear to be rather mild blemishes on an excellent health record. Table I shows some vital statistics.

In recent years increasing interest is being taken in the study of epidemiology—the reaction of human populations to epidemics of communicable disease.

The immediate task of the physician is the study of disease—the reaction of the human body to environment and to parasites. This individual response is the hand-to-hand fight, while epidemiology deals with the battle of humanity, the campaign in which thousands, even millions, of human beings are involved. These group or mass phenomena obviously depend on the individual and his bodily resistance, yet they present characteristics of their own, just as the functions of the bodily organs are integrated into the distinctive and different response of the organism itself. At times we are reminded of the change of properties when two or more chemical elements form a new

chemical combination or compound; at times an analogy can be drawn to the indirect response of the gyroscope which rotates instead of bending to the sideway deflecting force. The reaction of disease in populations, like a campaign, is thus only in part dependent on the individual fighter and has a behaviour of its own, which is only beginning to be understood.

The varied combinations of seed type, of the methods of sowing the seed, of the human soil or recipient, and finally of general circumstances, climate, aggregations of humanity, birth rates, migration *et cetera*, and the realization of the specificity of disease lie at the root of clinical practice and of epidemiology alike.

The behaviour of the dispersion or dissemination or circulation of the infecting agent from its original focus or foci is a phenomenon of great interest. We see it strikingly in the spread along traffic routes of a new disease, first overseas by shipping and then overland by rail, air or motor services. This was well shown by the pandemic spread of influenza through Australia in 1919, and especially in Armstrong's report on the New South Wales epidemic.

But why should an endemic disease retire comparatively into its shell for months at a time to burst more or less regularly into activity at some particular season? (See Figure I.) One can understand the rise of typhoid fever in early and late summer, parallel to the pest-wave of the common vector, the house fly; but no complete explanation

TABLE I.  
Vital Statistics, 1932, Queensland and other Australian States

	Queensland.	Australia.	Best.	Worst.
<i>Rates per thousand persons:</i>				
Birthrate, married women aged 15 to 44 years	145	131	Tasmania .. 131	South Australia 120
Infantile mortality	40.2	41.3	South Australia .. 36.6	Western Australia 45.6
Crude death rate	8.05	8.66	New Zealand .. 31.2	
Index of mortality	9.02	9.54	New Zealand .. 8.02	
Correction for age-sex constitution			New Zealand .. 7.9	
Maternal mortality	5.01	5.57	South Australia 8.69	Western Australia 10.21
Puerperal sepsis	1.67	1.40	Western Australia 4.02	New South Wales 6.11
<i>Rates per million persons:</i>				
Tuberculosis, all forms	362	459	Queensland ..	Tasmania 595
Tuberculosis, respiratory	340	406	Queensland ..	Western Australia 481
Tuberculosis, non-respiratory	22	53	Queensland ..	Tasmania 117
Respiratory tuberculosis in men	410	476	Queensland ..	Western Australia 647
Respiratory tuberculosis in women	261	334	Queensland ..	Tasmania 501
Cancer	896	1,050	Queensland ..	Victoria .. 1,178
Acute bronchitis	20	31	Western Australia .. 14	Tasmania .. 44
Chronic bronchitis	65	82	Queensland ..	Victoria .. 112
Pneumonia, all forms	417	518	Queensland ..	Tasmania .. 620
Chronic rheumatism	19	23	New South Wales .. 16	Victoria .. 32
Diabetes	120	150	Queensland ..	Tasmania 193
General paralysis of the insane <i>et cetera</i>	19	21.6	Tasmania ..	South Australia 28
Cerebral hemorrhage	351	453	Queensland ..	South Australia 576
Diarrhoea (under two years)	61	73	Tasmania ..	Western Australia 154
Diarrhoea (over two years)	67	61	New South Wales .. 58	Western Australia 69
Typhoid	21	12	Victoria ..	Western Australia 22
Appendicitis	85	73	Tasmania ..	Queensland
Suicide—				
Males	231	179	Tasmania ..	Western Australia 328
Females	55	48	Victoria ..	Western Australia 71
Persons	148	115	Tasmania ..	Western Australia 208
Accident—				
Males	753	700	South Australia .. 621	Western Australia 962
Females	208	220	Tasmania .. 152	South Australia 261
Persons	500	464	Tasmania .. 340	Western Australia 582
Nephritis—				
Males	567	566	Tasmania .. 382	New South Wales 610
Females	575	483	Tasmania .. 215	Queensland
Persons	571	516	Victoria .. 2	Queensland
Alcoholism	21	7.8	Tasmania .. 0	

is afforded of the monthly residuum throughout the year, except possibly as water or milk borne.

When we consider the respiratory infections, whether nose, throat or bronchial infections, the explanation is still lacking. Why should the autumnal rise of diphtheria be universally noted? Why should the peak of poliomyelitis occur in late

Other fields await investigation—the possibility of varying virulence of the organism, the probability of variability of resistance of the host, for profound biological rhythms occur in the human body of whose association with resistance we know little or nothing.

Just at the preschool and infant period of life occurs the curious seasonal variation of growth. Weight increases rapidly from February to July, abruptly ceasing in August, with little or no increase for the next six months. Height increase follows the reverse of the weight curve—high from September to February and then ceasing. Fitt, who pointed out this phenomenon in Australian children, demonstrated irregularity and instability by psychological tests at this August period, and believed that it showed itself in greater morbidity and mortality. Biochemical studies of the blood show the seasonal response of blood calcium to sunshine. Blood phosphate content and the behaviour of thyroid *et cetera* similarly show seasonal effects. Food and vitamins probably do not account for these changes, in which we see probably more profound biological rhythms, such as are typical of the moulting of fur in animals.

The epidemic wave has recently attracted great attention. Once a disease begins to spread, its further dissemination seems a fairly simple process to understand; but why should it stop spreading? We like to believe that some measure we have adopted has checked the advance of the invading organism, and at times our belief appears justified. Vaccination can blot out smallpox. The process of dividing up large camps into a series of small camps isolated from one another soon limits infective foci, as in measles. The discovery at a dairy of a carrier may settle any further danger of typhoid fever.

It is well, however, to realize that isolation hospitals may reduce mortality and increase our clinical knowledge, but cannot be expected to control the epidemic waves of endemic disease such as diphtheria or scarlet fever or measles or whooping cough. Infection has so many other opportunities to spread, beside the overt obvious illness. Mild unrecognized cases, temporary and chronic carriers, are quite uncontrolled, while the sick child itself has a shorter or longer period of illness and infectivity before the condition can be recognized, during which it may be freely moving about amongst its fellows.

What, too, are we to say of those epidemics in which little or no attempt is made to control the disease, as in mumps, measles, whooping cough, varicella, German measles, sore throats, colds, influenza. These show the seasonal behaviour and the epidemic wave, the rise to an apex and subsequent decline. Just as these diseases within the human body are self-limited in their duration, so is the epidemic wave in a human population often self-limited also.

Dudley's work on diphtheria has proved a real help. He has demonstrated in carefully controlled groups that the epidemic of diphtheria depends on

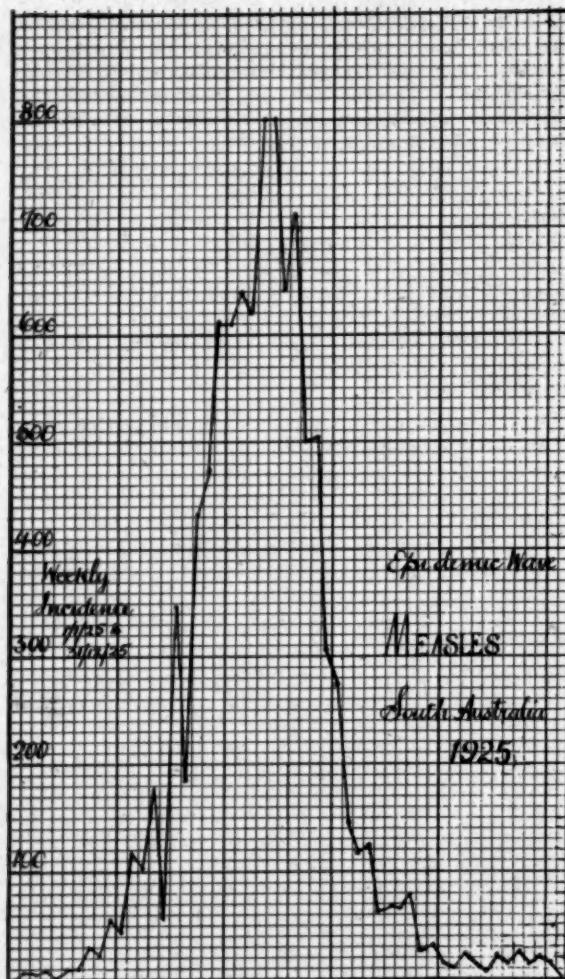


FIGURE 1.

summer? And still more why should whooping cough prefer the latter months of the year—spring and early summer? (See Figures II, III and IV.) Aggregation indoors suggests opportunities for spread of influenza, bronchopneumonia, bronchitis in winter, why not whooping cough?

Seasonal incidence must necessarily drive us to some climatic factor, such as insect incidence, dust, indoor life, holidays; but too often one realizes the incompleteness of common conceptions to meet the needs of the problem.

the proportion of immune persons. Apparently 100% immunity is not necessary to protect a group, but a fall to, say, 50% is associated with the development of clinical cases. Dudley uses the term "herd immunity index". Equal numbers of "Schick immunes" and reactors = 1:1 (unity). This rose in about eight months at school to 6:1.

Apparently, too, when spread of clinical cases occurs, the advancing wave of organisms passing from throat to throat is associated with two main effects. Either the susceptible succumb to the contact, the germs gain a hold, and the disease appears, or, perhaps because the dosage is small or the personal health more satisfactory, or for other reasons, immunity develops. Hence the invasion brings about

termination of the epidemic before exhaustion of the susceptibles; here the virulence of the organism must be considered.

To quote Sir George Newman:

Systematic investigation, experiment, and disinterested epidemiological inquiry is the life blood of preventive medicine. It extends the boundaries of our knowledge of disease, and our knowledge is still dangerously fragmentary and incomplete; it provides the facts of the case for legislation and administration; and it furnishes assistance in the great business of education, of foresight and of forecasting. Too often epidemics of disease in this country have caught us unawares, unready and unprepared. Yet their course follows the unvarying natural law of cause and effect. It is not disease which is capricious; that is rather the characteristic of the observer. It is part of the purpose of a scientific scheme

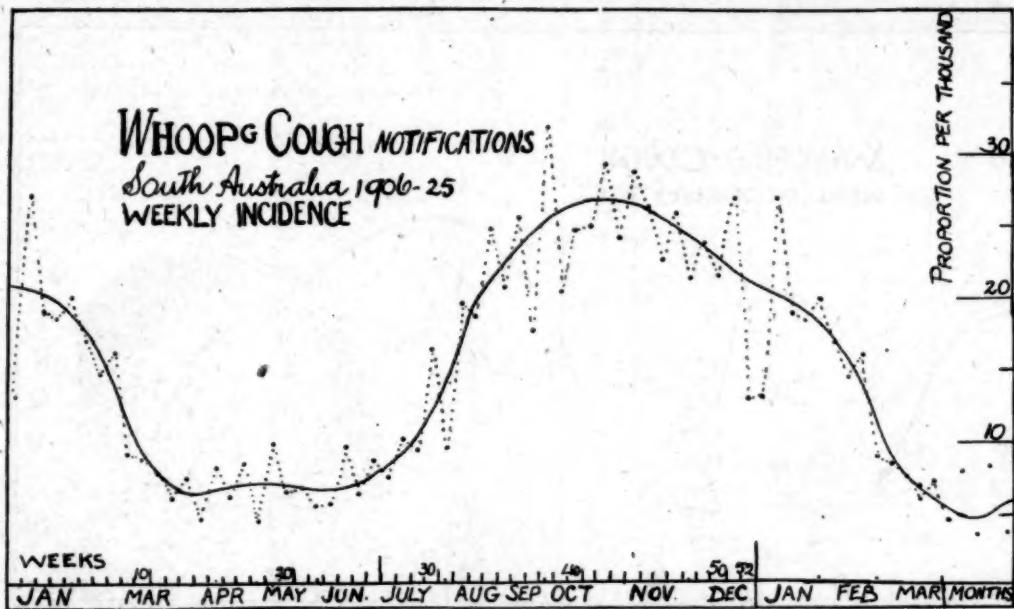


FIGURE II.

its own defeat, the peak representing the point at which the number of immune persons reaches a proportion which makes further spread increasingly unlikely. The development of immunity must take time, and so delay must occur before the immunity wave can catch up to the dispersal wave and neutralize it. Usually the fall is slower than the rise, but sometimes the epidemic may terminate more abruptly than it began, or the curve may be symmetrical.

The provision or the exhaustion of susceptibles and the creation of immunity, either by actual disease or by contact with a subminimal dose, explain many of the phenomena, both of the epidemic wave and of the epidemic cycles which spread over two or more years. Measles tends rather to attack all susceptibles, immunity being gained only by actual disease. Any escape is probably fortuitous. The same is found in mumps, though it is believed that immunizing subinfections may occur. On the other hand, the study of certain epidemic curves suggests to the mathematician the

of national health to reduce caprice, chance, and surprise to a minimum and to establish in their place firm and growing knowledge. Workers in preventive medicine must not find themselves unprepared with their plan of campaign or an adequate survey of the terrain until the enemy has published his ultimatum and it is too late.

Diphtheria illustrates many of these phases of epidemic behaviour.

Bretonneau described the disease in 1826. There is little doubt that, though it was present in England from 1734 to 1793, it was absent in the early years of the nineteenth century, until 1855. In 1859 came a great outburst of activity, which carried it as a pandemic round the globe to Australia.

Bacteriological confirmation became available after 1884, but with no beneficial effect until Behring introduced antitoxin in 1894, when a marked reduction in fatality followed, the mortality rate per 100 cases during the years 1890 to 1924 dropping from 21% to 30% to 3% (Cumpston).

In spite, however, of a generation of experience with antitoxin, so extraordinarily effective as a

treatment, especially in the first few days of the disease, diphtheria has remained virtually uncontrolled as an epidemic disease. Curative medicine has failed to provide prevention.

Meanwhile our knowledge of its behaviour as an epidemic is steadily improving. We now know that it is chiefly spread by droplet or spray infection under stagnant air conditions, and that the chief agent in its spread is the human carrier. In the majority of instances the carrier is a child who has recovered from the attack weeks or even months before. Unfortunately this chronic convalescent carrier possesses in his nose and throat tissue damaged by this or other nose and throat disease, such as unhealthy tonsils and adenoids, where a

Let us cast into the dusty limbo of forgotten things the all too prevalent ideas concerning drains and water tanks, bad smells and sewer gas. Abandoned also is the idea of spread by domestic animals and pets. The cat, that free lance among animals, must be granted a clean sheet.

Only by realizing that this is a human disease, conveyed directly by human agencies, have we any hope of future control. We must realize, too, that the main susceptibility, the chief incidence, the outstanding mortality and chief fatality are about the third year of life and are largely confined to the pre-school period of life.

To concentrate on the school, even the infant school, may help some children, but will miss the

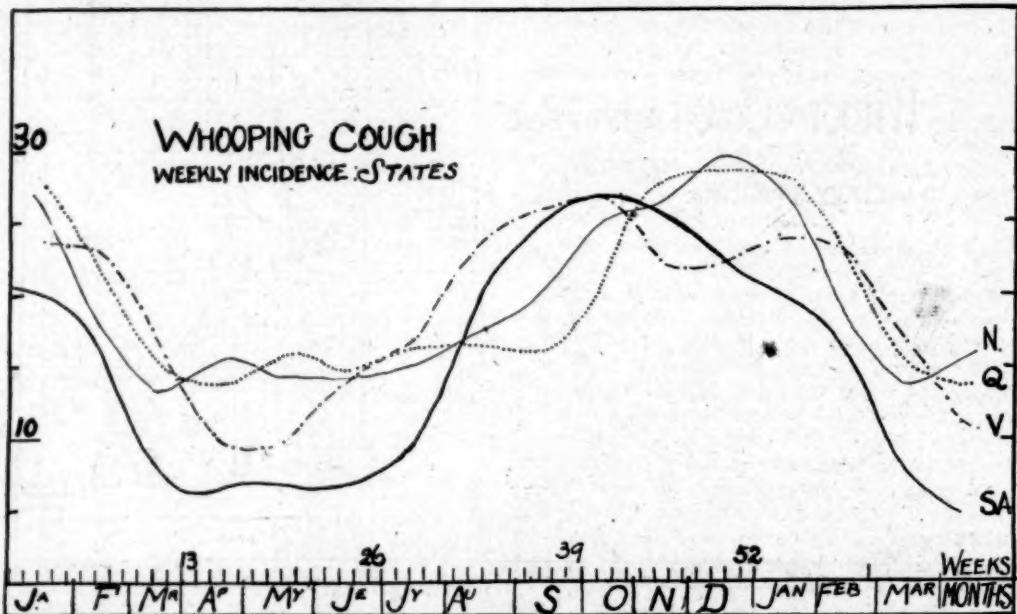


FIGURE III.

focus of virulent microbes remains (the chronic infective lesion in an immune host). Through nasal discharge or through coughing and sneezing the spray can infect others, usually children, within a short striking distance, generally less than six feet.

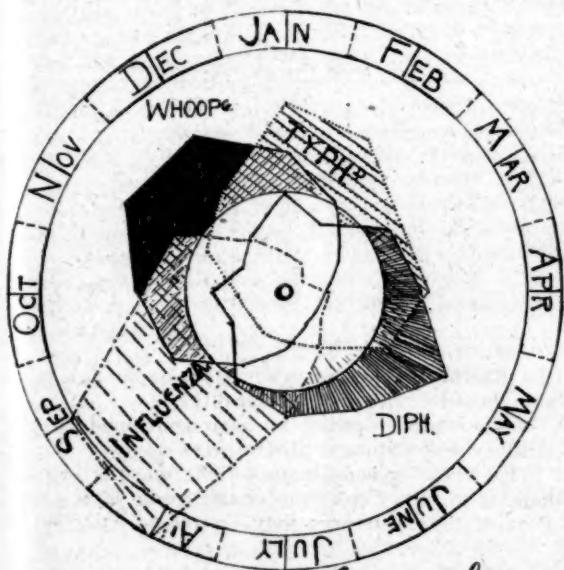
The temporary carrier who has not been ill is unimportant, except, as we shall see, as an agent to spread immunity. The unrecognized infection, whether in the mild undiagnosed sore throat or the sick patient in the first day or so of the disease, accounts for some of the spread. The common towel and the common drinking vessel or pen or pencil, so often put in the mouth, form part of the "traffic in saliva". These vectors are rapidly decreasing in effect and are readily met with by supply of individual articles and by cleanly habits. Occasionally a diphtheria carrier at a dairy or a milk vendor's starts up a minor epidemic, illustrating the futility of purely veterinary control when a human disease is concerned.

majority. The eradication of definitely unhealthy tonsils and demonstrable adenoids not only protects children from middle ear disease and deafness, but is a powerful prophylactic weapon in the elimination of carriers or potential carriers. Closure of schools, except remote rural schools, may bring the consolation of doing something, but is futile in control. It cannot affect the main focus in the pre-school children; it does not, thanks to the cinema, Sunday school *et cetera*, control child assemblies, and it spoils the valuable method of health supervision by the teacher, with early short exclusion of children for suspected illness.

In recent years the Schick test and the work of Sheldon Dudley have demonstrated the remarkable phenomenon of immunity created by subminimal doses of the organism. Hence contact of children under conditions of reasonable cleanliness and decent ventilation is actually an advantage. For every child infected probably only one in ten or

twelve gets the disease, but the temporary experience of the organism brings with it a life-long protection. Probably it is the massive intensive dose in the young child that decides disease. This herd immunity, so-called, explains the heavy hit diphtheria makes every now and then in rural areas where diphtheria is not the constant experience, as in the cities. It emphasizes the risks of the loneliness of the single child. It explains the heavier attack on schools that draw their pupils from residential areas.

The Schick test, too, has given us a basis for the protection of younger children, in whom fatality is so frequent and susceptibility so common. The League of Nations Health Committee has entirely endorsed the active immunization of children of pre-school and infant school periods by toxin-antitoxin or anatoxin (formol toxoid). In spite of certain happenings, we must face the fact of the



*Inner circle - 8.3% monthly average same for each week*

terrible burden that diphtheria places on the shoulders of our young toddlers, boys and girls of tender age, who must face the fire of infection and of imminent death to save the community of older children and adults. Immunity of the population at large is bought by the sacrifice of these our own children. It is only fair to them that we should explore every scientific method that can bring to them the assurance of safety while preserving the whole community from danger.

One interesting feature of recent years in the behaviour of diphtheria was its unexpected and striking drop both in morbidity and mortality in the year 1919, the year of the great influenzal pandemic.

Towards the end of 1918 (September, October) a definite increase occurred in influenza deaths, but this soon died down. Then came the two great waves of 1919. In New South Wales the first wave lasted from March 23 to May 22, to be followed by a second rise and fall, ending late in August. (See Figure Vb.)

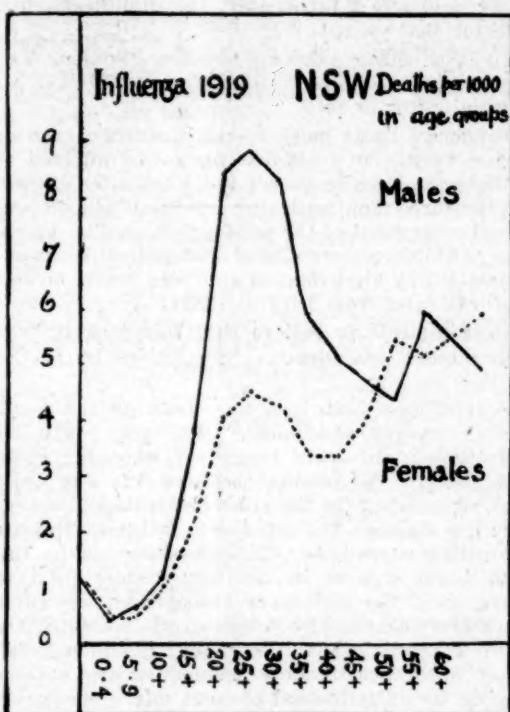


FIGURE VA.

The two peaks of intensity were reached about April 18 and June 26, or an interval of about ten weeks between the crests of the waves. In Sydney,

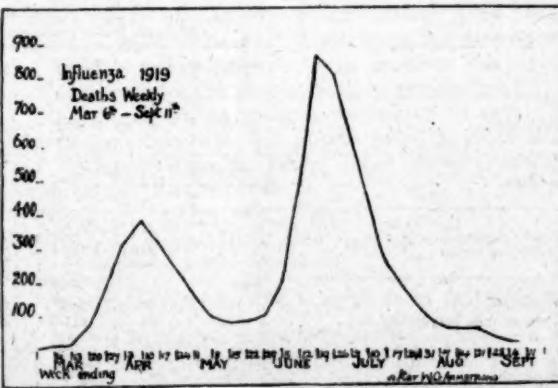


FIGURE VB.

Armstrong estimated that close on 300,000 persons were definitely infected. Few escaped some contact with the organisms, while of the sick 6,387 died.

In that year diphtheria figures for incidence and deaths in New South Wales dropped to about one-half of those for the years before and afterwards, and were not again even approached till 1923, another year of higher influenzal action. Although diphtheria occurs chiefly among young children, it is difficult to avoid the conclusion that influenza did affect, and affect favourably, the diphtheria death rate for that year.

In the State schools of New South Wales the incidence of every other type of disease was unusually low in 1919.

Influenza itself most severely attacked the age period twenty to forty-five years and affected the school ages much less severely. Even after allowing for the three months during which all schools were closed on account of the pandemic, a smaller proportion of children were absent from school because of illness of any kind than in any year before or since (records exist from 1913 to 1932).

It is difficult to believe that this was due to a mere chance coincidence. (See Tables II, III and IV.)

Scarlet fever had, it is true, been on the decline for two years previously. The year 1919 was definitely in the wave trough of whooping cough, and also in the interval between the steeple-like rises of mumps. On the other hand, these displayed very low figures. The diphtheria fall is inexplicable on ordinary grounds. Tuberculosis rose in 1919, with lower figures in the immediately following years, as if the serious or susceptible tuberculous cases had been largely "cleaned off the slate" that year. This was probably so among the older people. Rises in bronchitis and pneumonia are not surprising, as an influenzal element might easily have contributed. It is difficult, however, to explain the distinct rise in diarrhoeal figures for 1919 and 1920, with a subsequent fall. Influenza, with its protean manifestations, attacking the weak link in the body defences, may have caused this rise. Why, then, did

TABLE II.  
Education Department, New South Wales.  
Absence from illness per 10,000 children.

Year.	Mumps.	Chicken-pox.	Measles.	Whooping Cough.	Diphtheria.	Scarlet Fever.
1913	14	139	118	390	39	32
1914	5	54	33	120	30	21
1915	25	58	610	70	25	46
1916	238	55	115	200	30	39
1917	207	97	62	148	25	12
1918	88	104	620	140	48	14
1919	15	58	23	65	31	13
1920	13	154	756	346	41	90
1921	15	180	144	279	80	140
1922	1,265	157	125	130	57	20
1923	394	123	1,314	92	39	45
1924	29	205	170	120	50	54
1925	14	158	332	453	46	50
1926	20	187	860	86	22	51
1927	11	200	134	232	24	81
1928	1,040	164	765	85	24	50
1929	187	200	190	316	29	43
1930	44	243	425	154	25	35
1931	46	190	118	243	26	30
1932	170	156	323	857	23	34

TABLE IV.  
Scarlet Fever per Million.

Year.	Males.	Females.	Total.
1884	106	157	130
1889	60	90	74
1904	48	73	60
1890	23	35	29
1904	23	26	24
1909	9	14	12
1914	23	35	29
1919	6	7	7
1924	24	32	28
1929	24	40	28
1930	23	20	22
1931	14	15	14

1884 (259), 1921 (4).

the diarrhoeal death rates for those under two years subsequently fall so considerably?

Cancer rates appear to have continued to rise steadily and uninterruptedly.

The whole episode throws light on what Sydenham meant by "epidemic constitution of a year". Part of the occurrence may be due to coincidence,

TABLE III.  
New South Wales Death Rates per Million for Eleven Years.

	1914.	1915.	1916.	1917.	1918.	1919.	1920.	1921.	1922.	1923.	1924.
Influenza	47	70	75	47	191	3,193	125	189	103	233	117
Measles	10	171	39	16	39	4	91	19	7	63	16
Scarlet fever	11	51	57	16	9	8	12	4	5	6	13
Whooping cough	83	33	110	91	70	66	178	122	48	39	37
Diphtheria	132	140	163	129	120	63	124	142	94	75	95
Tuberculosis, respiratory	630	593	611	534	563	608	541	536	502	508	522
Bronchitis	283	285	297	250	310	327	283	240	181	204	186
Pneumonia	753	743	558	615	703	641	695	645	630	776	678
Diarrhoea in children under two years	699	635	568	329	323	561	615	469	338	469	383
Diarrhoea in children over two years	181	223	171	141	233	214	170	104	101	101	83
Cancer	748	782	775	783	829	867	836	882	870	857	932

but on the whole it hardly seems explainable by pure chance, and suggests strongly the influence of the prevailing epidemic on other disease epidemics occurring during the same and even subsequent years.

Apparently an epidemic of one disease can dominate the incidence of otherwise unrelated diseases. Possibly, too, as stated by Sydenham, it may affect their clinical course, symptoms, complications, sequelae and, therefore, treatment.

Although the coincidence of seasonal waves of various diseases explains much of these alleged manifestations, the complete explanation does not appear to be given by seasonal variations.

#### Endemiology.

In the seasonal influence on epidemic disease manifested by varying incidence during the year, and probably in part at least by fluctuations year by year, we see climatic and weather changes operating directly or indirectly through insect prevalence or otherwise. Endemicity of disease provides the geographical incidence and incidentally the special Australian aspect.

In Australia we have a gigantic natural experiment in operation. In a continent of most diversified climates, subarctic to tropic, with varying altitudes and conditions of soil and of forest, exists one of the most homogeneous white populations on the globe. Racial and other hereditary influences are identical, education and training in general are similar, so that differences, if any, must be due to local conditions, mainly geographical in nature.

The study of this human reaction to natural forces is only at its beginning. Difficulties arise because of the migratory tendencies of the Australian. Not only is there the constant movement from the country into the metropolis of young men and especially young women, but a great deal of exchange of population takes place between the States.

Much information may be gained by means of cross-sections of the community at typical ages, such as school medical inspection affords at the school age. Here the evolution of successive generations of Australians can be watched, and especially at present the first real Australian generation, the Australian-born child of Australian-born parents. District disease is an important feature concerning which we must inevitably look to the general practitioner. Already in the clinical study of disease and defect in Australia differences are apparent from the experience of the homelands of the race.

The following diseases occur in Australia and not in England:

#### District Diseases.

Barcoo rot: interior.

(Climatic bubo): tropical Australia (natives).

Dengue: Queensland and northern New South Wales.

Filaria: coastal areas north of Grafton.

(Granuloma): tropical Australia (natives).

Hookworm, coastal areas, 50-inch rain belt, north of Taree.

Hydatid: Sheep belt, south-eastern Australia.

(Malignant malaria): Papua and New Guinea.

Sprue: northern Queensland.

Trachoma: interior, west of the wheat belt.

(Yaws): tropical natives.

The following diseases are commoner in Australia than in England:

Chronic nephritis } Queensland.

Lead in children }

Ectopic gestation (maternal mortality figures).

Intussusception.

Keratoses, rodent ulcer, epithelioma of the skin (prolonged sun exposure).

Pink disease.

Tick bite.

Table V shows diseases or diseased conditions that have never occurred, that do not now occur or rarely occur in Australia, in Australians.

TABLE V.

Diseases that have Never Occurred in Australia.	Diseases Not now Occurring.	Diseases Very Rare or Not Occurring.
Botulism. <sup>1</sup>	Bilharzia.	Beri beri.
Cholera. <sup>1</sup>	Favus. <sup>1</sup>	Leprosy.
Kala azar.	Plague. <sup>1</sup>	Lupus vulgaris. <sup>2</sup>
Pellagra. <sup>1</sup>	Smallpox. <sup>2</sup>	Rachitic teeth. <sup>1</sup>
Rabies. <sup>1</sup>		Craniotabes. <sup>2</sup>
Relapsing fever.		Lamellar cataract. <sup>1</sup>
Tinea cruris.		Rheumatic nodules. <sup>1</sup>
Trichinosis. <sup>1</sup>		Scrofula and phlyctenular ulcer. <sup>2</sup>
Typhus <sup>1</sup> (epidemic type).		Undulant fever (Brucella abortus melitensis).
Yellow fever.		
Vaccinal encephalitis. <sup>1</sup>		

<sup>1</sup> Occurring in England.

<sup>2</sup> Has occurred in England.

The following conditions are uncommon or rare in Australia: cretinism, oxa varia, flat-foot, scoliosis, surgical rickets, gout, pediculus corporis, *Taenia solium* infestation, endemic typhus (Hone et alii).

The following conditions are decreasing in frequency in Australia: amyloid disease, bovine tuberculosis, buccal cancer, chlorosis, ophthalmia neonatorum, pediculi capitidis, stone (bladder).

The following conditions are increasing in Australia: angina pectoris, cancer after sixty, chronic nephritis, diabetes, tinea capitis, tinea pedis.

In the following infectious diseases the figures are of interest (rates per million population).

In the following there is reduction in morbidity (number attacked), but not in fatality (percentage of persons dying), hence there was a reduced mortality (total deaths):

Typhoid in 50 years to one-thirty-seventh.

Diarrhoea and enteritis in 50 years to one-eighth (infantile cases one-eleventh).

Hydatid.

Tuberculosis (respiratory) in 50 years to two-fifths.

In the following there is reduction in fatality, but not in morbidity (mortality reduced):

Diphtheria morbidity shows cyclical effects only; fatality in 30 years to about one-fifth.

Scarlet fever in 50 years to one-ninth.

Measles in 40 years to one-sixth.

Whooping cough in 40 years to one-third.

In the following there is reduction in both morbidity and fatality:

Bovine tuberculosis in 30 years to one-sixth.  
Hookworm in 12 years to not less than one-third.

In the following there are reductions in neither morbidity nor fatality:

Acute rheumatism.  
Pneumonic influenza.  
Bronchitis and pneumonia (rise largely due to rising proportion of aged persons).  
Poliomyelitis (tendency to more severe epidemics).

In the following there is increasing incidence (almost non-fatal diseases):

Dengue (area increasing).  
Mumps (epidemics still striking).  
Ringworm (increase of head ringworm and marked spread of foot cases).  
Varicella (steady rise of recent years).

Fatality rates in smallpox and plague are practically unaffected.

In reviewing our knowledge of geographical effects on disease and defect, we may first eliminate general effects throughout Australia, such as the effects of sunlight: (a) in eliminating lupus, that disfiguring skin disease seen only in immigrants, and (b) in preventing severe forms of rickets (moderate forms being common), while (c) a sinister effect is attributed to exposure to the sun over a prolonged period of years, namely, rodent ulcer of the head and neck (Molesworth).

Spurious geographical effects are of some importance; for example, those associated with human aggregations and especially occupational aspects of life. Tuberculosis is an urban rather than a rural disease, the world over. A map of the city or the State showing the infantile mortality will show the blackest patches of intensity in the industrial townships and in the overcrowded areas of the city.

A striking character well seen in, but not confined to, Australia is the heavy incidence of tuberculosis among quartz-miners and other workers amongst silica dust, while coal-miners escape lightly, no worse indeed than the average of the community.

General climatic effects with strong seasonal influences have been clearly demonstrated in diphtheria, scarlet fever, typhoid, bronchitis, whooping cough, influenza and other epidemic diseases, as already noted.

Two other important epidemic diseases deserve notice.

Dengue fever, chiefly occurring in Queensland at long intervals in pandemic fashion, has spread into northern New South Wales. Its incidence is limited by the presence of the mosquito *Aedes argenteus* (*Stegomyia fasciata*) (see Figure VI). The last extensive epidemic, 1925 to 1926, reached southward as far as a line stretching from Gosford to Walgett. Mr. Taylor, the entomologist at the School of Public Health and Tropical Medicine, has demonstrated

the mosquito many miles further south—Sydney to Mumbil—apparently a definite extension southward, and has noted the freedom of places above 2,000 feet in altitude or in places where the inhabitants have got rid of water tanks by the municipal installation of a water reticulation service. It was probably the latter that saved Newcastle during the last epidemic. As the mosquito carrier of dengue is also capable of transmitting yellow fever, the importance of mapping its occurrence is obvious. Yellow fever, should it break through Central Africa, may yet give rise to one of the greatest epidemics in human history.

Epidemic ophthalmia, "pink eye", "bung eye", is an epidemic of acute conjunctivitis due to the Koch-Weeks bacillus spread by the bush fly, and to some extent by the house fly, both non-biting flies. It has a strong seasonal prevalence, spring and early summer, with recrudescence in late summer, not unlike typhoid fever. The attack rarely leaves any severe damage. It is quite distinct from trachoma, though infection of a trachomatous eye may light up the latter disease and cause severe damage. It is prevalent over the tablelands and not in the trachoma areas. Extensive epidemics occur at cyclical intervals.

The last and most important and typical endemic group have definite geographical limitations independent of season.

Hydatid disease, as is well known, requires for completion of the life history of this dog worm an intermediate host, usually the sheep. Unfortunately, man can also accommodate this intermediate cystic stage, though completion of the life history does not then occur.

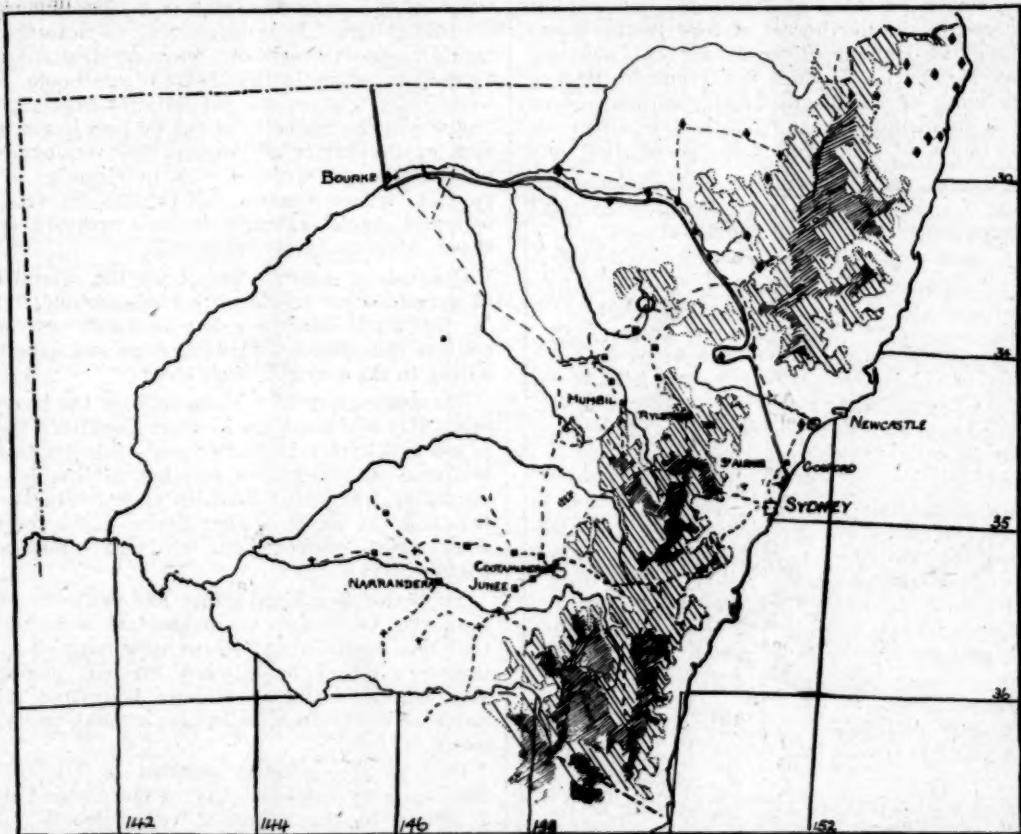
Clunies Ross has demonstrated the frequency of worm infestation of this type in dogs (30% to 40%) in towns belonging to the New South Wales sheep belt (south coast and southern tableland), while Dew has mapped its occurrence in Victoria in similar situations. Incidentally one may note the general limitation of sheep-growing to the areas within the average annual rainfall lines of ten and forty inches, with marked concentration along the twenty-inch isohyet (Thomas). Hydatid disease is chiefly found in the south-eastern section of the continent, within this sheep belt.

We need worry little about water as an intermediate source, but should concentrate on the establishment in main centres throughout the State of municipal abattoirs, which automatically interrupt the possibility of the dog becoming infested by eating uncooked offal (*liver et cetera*) from slaughtered sheep. We should persuade all pastoralists to cook offal before feeding dogs, induce all dog owners within the sheep belt to use a monthly ritual of worm medicine, and to clean thoroughly and regularly both the dog and its kennel; and finally we should insist on the practice of personal hygiene by every person, especially every child, the hands and nails being thoroughly cleansed with soap and water and nail brush after handling a dog's fur and before meals. Vegetables

eaten uncooked should be thoroughly rinsed in cold water and then dipped and shaken for thirty seconds in boiling water; this removes or destroys any hydatid egg contamination.

Goitre is a locality phenomenon the world over. It occurs on the edges of the tablelands or ranges over 3,000 feet high, with moderate to heavy rain-

South Wales, Victoria and Tasmania. It is virtually unknown in Western Australia and South Australia, and is apparently rare in Queensland. It should appear in Western Australia when the south-western forest area becomes populated, and in Queensland it may be expected from its usual geographical associations to be found.



*Map of New South Wales to show Southern Limit of Aëdes (Stegomyia) aegypti.* ♦ 1926 E.W.Ferguson. ■ 1933 Rydstone and 1936 Narandera J.H.Taylor.  
† Not found 1933, 1936.) Limit of Dengue epidemic 1926 (NSW Health Dept Report.  
Land above 2000 feet. ▨ Land above 3000 feet. South Western limit Cookamunda-Narandera  
Aëdes rarely occurs above 2000 feet Dengue 1926 corresponded with Aëdes findings

fall (especially winter), with a quick run-off; leaching, it is said, the iodine from the soil (see Figure VII). It does not occur in the inland slopes or plains, where the intense heat of the sun, evaporating the moisture from the soil, brings the salines up to the top again.

Endemic goitre—simple enlargement without symptoms, present in boys as well as girls, associated with sound growth, both physical and mental—is common in suitable localities in New

Water pollution, it is suggested, may determine the incidence in the individual within a goitrous area.

No geographical association for thyreoid disease (exophthalmic goitre) has been proved.

Trachoma ("sandy blight"—sandy alluding to the gritty feeling in the inflamed eye; but the association is with dust, not sand) is a serious problem of the interior. The history of Australia shows its association with early settlement (Cumpston).

Sydney, Melbourne and Brisbane had bitter experiences with trachoma, dysentery and food shortage. Now it is confined to the area remote from closer settlement. In New South Wales the map of trachoma shows that it is not now seen (except in imported cases) east of a line from Tamworth to Wagga (Poidevin), that only occasional cases occur away from the railway lines in the mid-west, that a definite constant finding of 5% to 20% or more is experienced in the north-west of New South Wales and along the Darling River as far as Pooncarie (Cawley Madden). It does not occur in Broken Hill, in spite of its geographical position. Noteworthy is its disappearance from the lower Murray, on both sides of the river, from Swan Hill and

to settlement and civilized life. The conclusion seems inevitable that diet is the basis for this improvement. The frequency of barcoo rot in similar areas to those of trachoma demonstrates the lack of vitamin A, the vitamin which does so much to aid resistance and to prevent xerophthalmia, or "dry eye" in animals. Trachoma is, of course, an infection, but the onset and the persistence of the infection appear to be favoured by dietetic failure. It is interesting to note that this would seem to explain why Australian troops escaped infection in that home of trachoma, Egypt, where over 90% of the inhabitants have trachoma and where the intensity of the fly pest has a reputation of thousands of years. The employment by practitioners of articles rich in vitamin A, dried spinach, tinned tomato, butter, fish oil (cod liver oil) and special extracts seems worthy of trial in these obstinate eyelid conditions.

Queensland deserves credit for the establishment of a residential trachoma school—unique, I fancy, in the world—and for her energetic attempt to control this disease, so dangerous and cruelly disabling to the eyesight of children.

The association of hookworm with the heavy rain belt (fifty inches or more) from Cooktown to Taree is too well known to dwell upon. A heavy incidence is found in aborigines, whether groups in camps or among wandering families or individuals. Both this and the much smaller figure (2%) for whites show great improvement on past findings (see Figure VIII).

No better organized effort has yet been planned than the Australian campaign. It is to be hoped that this devitalizing disease, now reduced to small limits, will not be allowed through neglect and short-sighted economy to ruin body and mind of numbers of children, as it has in many parts of the world.

One of the greatest puzzles in clinical work remains as a responsibility of Queensland doctors. I allude to the series of vague fevers, such as Mossman fever (Baldwin), whose separation into clinical entities and whose causation, prevention and treatment still await complete solution.

Just as pink disease was first described by an Adelaide practitioner (Swift), so we await a series of communal studies of clinical phenomena made in Australia, studies which, Sir George Newman points out, are the characteristic and chief claim to renown of British physicians.

A real stumbling block is the distorted view of research which has grown up. How many view it as inseparably associated with laboratories, highly expensive apparatus, complicated technique, incomprehensible mathematical analysis! The whole history of science denies this—the man will always be greater than the instrument; and remember, the most valuable instrument in Nature is the human mind. Accurate observation and commonsense reasoning established the contagiousness of disease before bacteriology came. The laboratory is invaluable



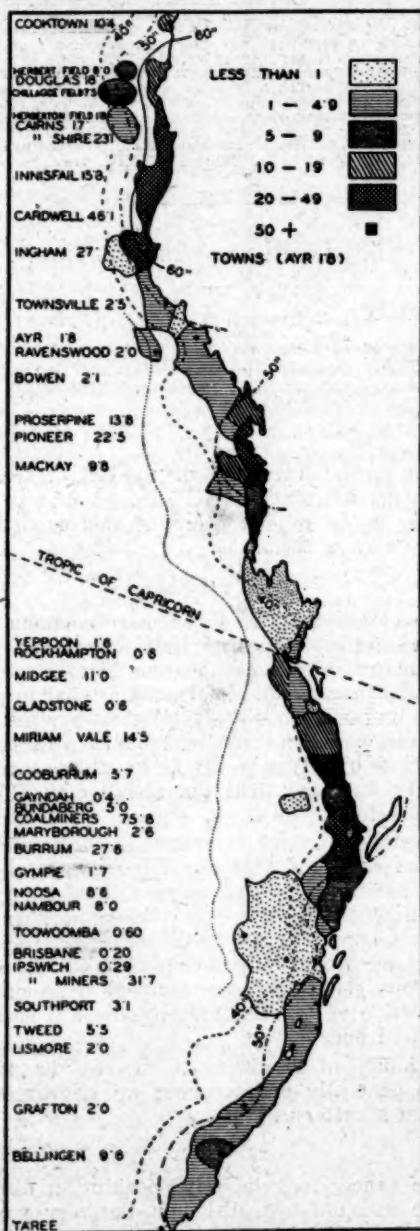
FIGURE VII.

Goitre (thyroid enlargement) percentage incidence in school children in association with contours of 2,000 and 3,000 feet in eastern Australia. (From the *Australian Geographer*.)

#### Deniliquin (Poidevin) to Mildura and Wentworth (Eileen Fitzgerald).

Though the incidence in this area was heavy as late as 1915, it is now rarely if ever seen. Like Broken Hill, this area is still subject to heat, dust and flies, the regular associations of the disease, but the disease itself has gone. The only change in this area in the interval has been the advance of the wheat belt and of the railways—the change-over

able in confirming, reinforcing, inspiring and testing clinical investigation, but it cannot eliminate the field observer.



Hookworm—coastal strip of Queensland and New South Wales, showing incidence and association with average annual rainfall lines for 40 and 50 inches north of 32° S. (From the *Australian Geographer*.)

Filaria has been demonstrated as far south as the north coast (Tweed Heads) area of New South Wales, but its disabling forms in elephantiasis *et*

cetera seem to be increasingly uncommon in the territorial dependencies of Australia and the adjacent island groups. Here a definite line can be drawn between the island groups where the nocturnal form is prevalent, and those where the day or constant filaria type is dominant.

Malaria is now confined to York Peninsula, the gulf country and the hinterland of the Northern Territory and northern part of Western Australia. It should never be forgotten that an effective insect vector is found throughout eastern Australia as far south as Tasmania, that the most severe form of malaria (malignant tertian) is endemic in Papua and New Guinea, that intermittent fever (malaria) has, many years ago, been seen in Brisbane, and that malaria is a thorough nuisance in places like Poland, much colder than Australia. Malaria in the islands shows a definite limitation to its southern and eastward spread by a line.

Without displaying undue confidence, we can defeat malaria whenever as a community we are prepared to pay the piper. The spread southward across the Torres Straits of the malignant tertian type will intensify the problem. It is strange, in view of the relative world shortage and high quinine prices, that Baron von Mueller's suggestion, made in the sixties of last century, that forests of quinine trees should be established in northern Queensland.

It is remarkable that Melbourne University Medical School has been in existence for seventy years or so, and Sydney celebrates its jubilee this year (1933), yet no Australian text-book of clinical medicine has been written by an Australian. We may reflect, too, that the best text-book on medicine in English (Osler) was written by a Canadian.

The Australian practitioner has an unrivalled opportunity, as a result of his constant contact with human beings of all types, his long experience, the advantage of knowledge from childhood of his surroundings.

Our universities spend the first four years of the medical course in training students in the basal sciences of medicine, during which scientific method is taught and practised. Constant investigation into clinical phenomena is maintained during the last three and, including the resident period at hospital, four years.

An increasing number of graduates study for post-graduate diplomas and degrees, many visiting the Meccas of medicine and surgery in the old and new world.

May not our contact with overseas books and teachers have denationalized Australian medicine? Australia looks at the world and has gained immensely by this international outlook. Research, which knows no boundaries of land or sea, race or politics, is the life-blood of progress. But research is a delicate plant that, like charity and health, begins at home. Can we, as Australians, honestly say that we have made any systematic or concerted attempt, as a body of medical scientists, to carry out what is after all our responsibility, and our

responsibility alone: the scientific investigation of clinical phenomena throughout Australia—the scientific study of the Australian himself.

Were hospital records and practitioners throughout Australia to maintain a good thorough card index system of diseases and dates, giving the essential facts and a reasonably full history of their cases, the study of morbidity in this continent—notoriously incomplete—could be greatly improved. Such cataloguing of cases would be of real help to the doctor as well as being characteristic of very efficient organization.

Anyone who has attempted to tap the experience of large numbers of practitioners will bear me out in the need for such systematization.

Were 5%, 250, of the 5,000 practising doctors in Australia to publish a thorough clinical survey of their own area over a number of years, were 1% of this army, 50, each to study one disease or small group intensively for a life-time, progress would be amazing.

In conclusion I wish to proclaim my faith in the future of preventive medicine and in the future of the medical profession of Australia, for curative and preventive medicine are inseparable. More and more the practitioner will realize his duty to the State as well as his duty to his patient: his outstanding responsibility as the first observer of disease, the intelligence officer of the army of preventive medicine, his function as interpreter of personal and public health to his clients.

Thus he will hand on the tradition of great pioneers, will develop our knowledge as Australians of Australia, and finally hand on the lamp of knowledge to posterity, burning undimmed to light the uncertain footsteps of suffering humanity.

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#### SKIN CANCER AND ITS TREATMENT.<sup>1</sup>

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PRIOR to embarking on the subject of treatment in relation to skin cancer, I intend first of all to consider a few other aspects of this condition, as far as we know them.

#### Climatic Influence.

Skin cancer appears to be more common in the tropical and subtropical regions of northern Queensland than in the cooler temperate regions of southern Queensland. It also seems that in proportion to its population (947,534) there are in Queensland more patients suffering from skin cancer than in New South Wales. It is on this aspect that statistics supplied to this conference should be of great service.

The statement once made, that the incidence of skin cancer was related to the percentage of atmospheric moisture, does not appear to be true, at any rate in Queensland. Skin cancer appears to be equally as prevalent in the humid coastal as in the dry inland areas. On the other hand, the further north one goes, the more common it seems to be, irrespective of whether the climate is a coastal or an inland one.

A change of residence to one of the southern States generally brings about an improvement in existing keratoses.

#### Age.

Skin cancer is, relatively speaking, a disease of middle and old age, although the very young do not escape entirely. Only a few cases in the first decade have been recorded by us.

#### Occupation.

An outdoor occupation appears to be accompanied by a greater tendency to skin cancer, although indoor workers are not by any means free

<sup>1</sup> Read at the eighth Australian Cancer Conference, Canberra, April, 1937.

of this complaint. It is a coincidence that the figures at the Brisbane General Hospital show the number of males affected to be the same as the number of outdoor occupations, and the number of females to be the same as the number of indoor occupations.

Those who work with their sleeves rolled up and their arms exposed to the sun develop keratoses and skin cancer more frequently on the forearms than those who do not expose their arms to the sun.

So far, the effect of sun-baking has not been noticeable, except in an occasional case of rodent ulcer on the foreheads of young people who do not wear hats. On the other hand, lesions of the forehead appear to be more common in the area covered by the hat-band, where sweat collects.

#### Chemical Irritants.

Soot, tar *et cetera* do not seem to be as important here as they are stated to be in other countries. Only one instance of cancer of the scrotum appears in our figures. This occurred in a man who had been a steeplejack and who had never worked anywhere but outside the chimneys. I do not know whether or not there was enough soot in his work to cause the condition. Tar workers have been noticeable by their absence from our series.

#### Racial Features.

Black races appear to be much less frequently affected than white. I have not seen a single rodent ulcer or an epithelioma in an exposed part of the body of any of the Australian aborigines, although keloid scars are very common amongst them. Epithelioma of the genitals is not uncommon.

Information that I have received from India leads me to believe that skin cancer on the exposed parts of the body is not common in the native races there. On the other hand, information from Java is rather the reverse of this. The incidence of skin cancer, according to the figures from the Cancer Institute at Bandoeng, shows that about seven coloured persons to one European are affected. Possibly some satisfactory explanation of this may be forthcoming later.

#### Complexion.

In some families for several generations there appears to be a lack, or an irregular distribution, of skin pigment, and so the normal protection afforded to the deeper layers of the skin by the presence of pigment is lost.

The fair-complexioned people who freckle and peel on exposure to the sun are more prone to skin cancer than those with fair complexions who brown on exposure to the sun, probably because the protection afforded by the skin pigment is patchy in the former, and both suffer from skin cancer more than dark-complexioned persons.

#### Exposure to Sun and Heat.

The two most common varieties of skin cancer are the rodent ulcer and the squamous epithelioma, and they originate in entirely different ways.

Rodent ulcers more commonly occur in the wrinkles of the skin, especially in the regions round the eyes; in the folds at the junction of the nose and cheek, of the nose and upper lip; behind the ears; inside the external auditory meatus; on the forehead and under the chin. All of these regions are slightly shaded from the full exposure to the sun, when compared with the tip of the nose and the ears, situations in which squamous-celled carcinomata are relatively common. If exposure to the sun was the chief factor in the production of both, one would not expect such a difference in their distribution.

Squamous epithelioma commonly originates in an old keratosis of the skin, but a rodent ulcer rarely does. An epithelioma may develop in an old rodent ulcer, and both may occur in different parts of the same person. Multiplicity of lesions is more common than a single lesion.

The cholesterol theory, according to which the normal cholesterol of the skin is changed into a carcinogenic agent by the action of the sunlight, is quite interesting and possible.

Chronic irritation or injury, lack of cleanliness of the skin, continued exposure to X rays or radium, may all cause epitheliomata.

Scars of old burns, keloid scars, scars of any variety, all have a tendency to degenerate into epitheliomata. Whilst the lesions are bounded by scar tissue, their extension is slow; but once they escape from this barrier, their progress is rapid. I have a case in which squamous epithelioma followed a wound caused by a stake, which penetrated the foot from the plantar aspect and came out on the dorsal aspect. A squamous epithelioma occurred soon afterwards in the scar on the dorsal aspect of the foot.

In addition to the most common varieties of skin cancer already mentioned, namely, the squamous epithelioma and the basal-celled or rodent ulcer, there are other less common varieties, such as the transitional celled carcinoma and the melanoma, which may be only briefly mentioned here.

One variety of the transitional celled tumour, the lymphepithelioma, is generally recognized only by the time that it has infected the regional lymph glands. It is extremely radio-sensitive, but as an offset to this it disseminates through the body very rapidly; and although radiation treatment heals the accessible lesions, death generally supervenes in a few years from metastases to the liver or mediastinum.

Melanoma in our hands has proved resistant to radiation treatment, and wide excision of the local growth is generally advised by us. At one time I should have said that I always advised radium treatment in addition to excision; but recently sloughing has followed the use of radium in two cases, even though the dose had been a small one; and I have advised that in future, whenever the lesion is situated over tendons or dense fascia, at either the ankle or wrist joint, no radium shall be used to supplement the surgical removal.

**Treatment.**

Treatment may be divided into two main categories: preventive and curative.

**Preventive Treatment.**

Since we have admitted the influence of the sun in the production of epitheliomata at any rate, the first preventive measure is to protect from exposure the skin of the face, neck and forearms. This may sometimes be satisfactorily accomplished in temperate climates merely by wearing a wide-brimmed hat or by not going out of doors in the middle of the day, or by rolling down the sleeves *et cetera*.

Such simple measures, especially in the more tropical regions, are, however, quite often impossible to carry out for those whose work is out of doors, and even more difficult for those working on the water, the reflection from which only multiplies the burning effect of the sun.

Many workers object to the inconvenience of a large hat and prefer to risk sunburn.

The use of some cosmetic which acts as a filter to the sun's rays, thereby preventing them from reaching the skin, is what I have recommended for many years.

In the past the objection to the use of cosmetics was that the most effective were the most visible, and that their use was difficult to conceal. Formerly I used to give my patients bismuth oxychloride powder to rub into the exposed skin. This had the advantage of not washing off, even in the surf, nor of disappearing during the day's work, and yet it could easily be removed with a little soap and water, aided by some grease. However, it had the disadvantage of making one look rather like a circus clown, and the user was frequently not recognized by his or her friends—not always a disadvantage—especially when fishing or bathing.

In those days one needed a very tender skin before resorting to such measures of protection; they were, however, very effective.

Recently there have come into use many other cosmetics which are not at all objectionable in appearance and which offer a fairly efficient protection to the skin against sunburn. The two most useful of these are, first, a cream containing some slight colouring matter in addition to tannic acid, and, secondly, a lotion of spirit containing some resinous material associated with tannic acid, and a little colouring matter. When the lotion is painted on the skin and allowed to dry, it is not easily detected and is an effective protection against the sun. It also does not wash off easily.

The second most important prophylactic measure is cleanliness of the skin. On what constitutes cleanliness no two people agree, and it is surprising how the toilet of the skin is neglected.

I am of the opinion that the cause of rodent ulcers is not exposure to the sun alone, but is even more the result of dirt and decomposing sweat.

In the scrotal carcinoma of the chimney sweep, in the carcinoma of the mule spinner, and in rodent ulcer of the skin of the face there is the similarity

in all three that the disease originates in the wrinkles of the skin, as the result of some irritant. In the chimney sweep a carcinogenic agent in the form of soot collects in the wrinkles of the skin, and in the mule spinner an oily substance collects in the wrinkles of the skin. It is probably not washed out properly in either instance, and I think that the theory of decomposing sweat in the wrinkles of the face, as being a cause of rodent ulcer, is a better one than any other so far advanced.

Drovers and well-borers seem particularly to be affected by both rodent ulcers and squamous epitheliomata; they are both exposed to the sun and dust, and generally suffer from shortage of water. It seems, therefore, that cleanliness of the skin is extremely important.

Frequent washing with good quality soap and water—not merely a hurried washing, but a mild scrubbing—is required in order to get the dirt and grease out of the wrinkles of the skin. Hard water does not clean the skin satisfactorily.

The history of injury has to be frequently discounted; for example, a cut from a razor or a scratch by a child or animal is frequently ascribed as a cause, and yet one can see that the lesion has been present for a much longer period than the history indicates. This can be explained by the early lesion not being sensitive and by its presence not being noticed until attention has been drawn to it by a slight injury.

**Curative Treatment.**

We now come to the curative measures, the most important of which are the early recognition and treatment of the pre-cancerous stage of the squamous epithelioma, namely, the keratosis, and of the early rodent nodule. The matter of recognition can be improved by education of the public and of the medical profession. Keratoses may be quiescent for years or may spread slowly. On the other hand, they may suddenly thicken and develop heaped-up edges, which indicate that they are no longer pre-cancerous, but definitely cancerous. It is surprising how little the public appears to know about these early conditions.

Provided there is no appreciable infiltration, the application of lightly filtered radium in the form of surface plates has given us excellent results in the treatment of keratoses and early rodent ulcers, although we cannot claim 100% of cures even for these lesions.

There are several reasons for the few failures. The plates either have not been accurately placed or the extent of the lesion has not been accurately gauged, because the lesions often spread along the wrinkles of the skin in a manner which is difficult to see. These extensions may be detected as fine, hair-like lines by putting the skin on the stretch. They may measure one-quarter or even one-half an inch in length.

Rodent ulcers or basal-called carcinomata, which in their early stages usually appear as small, slightly elevated, more or less translucent nodules,

may be easily detected by running the fingers gently over the skin surface. At this stage they may not be more than a few millimetres in diameter or in depth, and are easily treated by surface radium plates with very satisfactory results.

I shall now make brief mention of the several methods of treatment. In the course of the last thirty to forty years many treatment methods have been fashionable. Of these, surgical removal is the oldest, and in many cases is still one of the most successful. X rays and radium have both had their waves of popularity; first one has been in the ascendancy and then the other. Carbon dioxide snow and diathermy are also successful in some types of skin cancer. Carbon dioxide snow leaves a scarcely noticeable scar; it is useful in the more superficial keratoses. Diathermy is useful when bone is involved. By means of diathermy a limited area of bone may be destroyed, which in the course of time separates off as a sequestrum. Diathermy in conjunction with radium treatment is also useful as a means of quickly removing large masses of carcinomatous tissue. On the other hand, diathermy, indiscriminately used, may be dangerous; probably from a desire on the part of the operator to leave as little scar as possible, it may not be used deeply or widely enough. In most of these cases superficial healing generally takes place, but after the lapse of some months a deep recurrence may be detected by the formerly satisfied patient.

The same remarks apply equally to the method of curetting and skin grafting. They merely cover up the disease temporarily, and remind one of the old fable of the ostrich and the sand.

So far as our experience of surgical removal goes, we have not found it detrimental to the use of radium, unless interference with the blood supply has taken place. It is more rapid in its results, but generally leaves more disfigurement than radium.

X rays of medium voltage (about 130 kilovolts) have in the past given fairly good results, but were responsible for some ugly scars and not a few recurrences even in some of the most favourable cases, and failed completely in the deeper and more extensive lesions.

At the present time there is a wave of popularity for a form of low voltage X ray treatment. I notice that the claims originally made by the advocates of this method have been considerably modified. I think that in the hands of those who have had experience with ordinary radiation therapy there will be a certain limited field of usefulness for it.

Modern high voltage X ray treatment has been more successful in deep and extensive lesions and in the treatment of glandular extensions.

Radium, both unfiltered and heavily filtered, has been the most successful agent in the treatment of skin cancer. The greatest compliment paid to radium treatment is the effort made by all who use other varieties of radiation treatment to produce something which faintly resembles the radiation of radium.

In keratoses,  $\beta$  radiation from unfiltered radium is most effective. After the area of the lesion has been mapped out, a radium plate with 0.1 millimetre of monel metal filter, covered with 1.0 millimetre of rubber, and about 20% larger than the lesion, is applied to the surface for varying periods, depending on the depth of the lesion and on the milligrammes of radium per square area of the plate—usually from twenty-five to ninety minutes for a unit strength plate.

By reducing the dosage to the barest minimum a slight erythema follows in two or three weeks' time, and in another two or three weeks the lesion will have completely disappeared. If the dosage has been suitably regulated, the site of the treatment may scarcely be detected a few months later.

Should the dosage have to be increased on account of the depth of the keratosis, a pale spot may be left, which, unlike the surrounding skin, does not brown on exposure to the sun.

The size of the plate must be sufficient to do more than cover the lesion; otherwise failure to cure the outskirts of the keratoses merely leads to a further gradual extension of the lesion and necessitates treatment to the parts which have been missed.

*Rodent Ulcers of Small Size.*—Nodules or ulcers which are not more than three millimetres in depth and less than one centimetre in diameter are also treated by surface plates; but they are given heavier doses of radiation than the keratoses, and occasionally some additional filtration is used. Should there be any doubt about the condition being completely healed at the end of about six weeks, treatment with interstitially applied radium is given. Care has to be exercised in the choice of the lesion suitable for the use of unfiltered radium, because if the lesion is at all large in extent or has any appreciable depth, a recurrence may take place should the depth or extent of the lesion be misjudged.

*Interstitial Applied Radium.*—In all rodent ulcers showing a depth of more than two or three millimetres, and in all squamous carcinomata, irrespective of their depth, we prefer the interstitial use of radium. Should the area be more than three centimetres in diameter, or should bone be involved, radium is not applied interstitially, but a radium mould is used instead.

For the interstitial application of radium, unit strength needles, 1.0, 2.0 or 3.0 centimetres in length, filtered by 0.5 millimetre of platinum, are used. The needles are inserted around the margins of the lesion, generally in the form of a triangle or rectangle. Occasionally they are placed in parallel 1.5 centimetres apart. The needles are maintained in position usually for seven days, even in the treatment of rodent ulcers, which are said to be more sensitive than the squamous carcinomata.

The needles with 0.5 millimetre monel metal filtration we have discarded, as the results following their use were not so satisfactory as with the 0.5 millimetre of platinum filtration. I think that the shorter period of treatment, rather than the lighter

filtration, was responsible for the higher percentage of poor results.

For several years we have been giving rodent ulcers the same length of treatment as we give the squamous carcinomas. We space the needles, however, a little further apart in the treatment of the former.

I have no intention of entering into any controversy on what is or is not the correct dosage, and whether or not rodent ulcers should receive 3,000 r or squamous epitheliomata 6,000 r.

It seems to me that there are many successful variations of carrying out radium treatment. The main essential for success appears to be experience in judging the extent, shape and depth of the lesion, and in the suitable disposition of the radium around the growing edge of the tumour, and also to give as much irradiation as the normal surrounding tissues will stand without destruction. A photograph of the radiation from radium needles arranged in various geometrical figures shows how the maximum intensity of the radiation is received by the growing edge of the tumour, where it is most needed, whilst the centre receives the minimum amount.

**Radium Moulds.**—In the treatment of growths of three or four centimetres in diameter, radium is applied on moulds of Columbia paste or spongy rubber, of a thickness of either two or three centimetres, which are maintained in position for seven to ten days, and occasionally for longer periods. The dosage that we use is sufficient to produce a fairly severe erythema and surface denudation of the epithelium.

At one time we used to treat many of the smaller lesions by means of small moulds, but the results were less satisfactory than with interstitially applied radium.

Though distance treatment theoretically gives a more uniform distribution of irradiation than the interstitial application, in our experience the latter gives the better clinical results. We prefer to use the interstitial method whenever we consider it to be suitable.

Recurrence of the larger tumours treated with moulds is commoner than of the smaller tumours treated with interstitially applied radium, probably because the larger growths involve a greater diversity of structures, such as bone, cartilage and fibrous tissue. We find that cartilage does not undergo necrosis as easily as it was supposed to do.

Should a recurrence take place, we then consider whether the next attack shall be by means of a further radium treatment or by surgical removal, either alone or followed by radium or X ray treatment.

**Varying Sites Cause Dissimilar Results.**—We find that some parts of the body and face react differently to others and that treatment has to be varied accordingly. For example, in the naso-labial fold we find that there is more liability to recur-

rence than in any other part of the face, and in consequence we have slightly increased the dosage in that area, and if the lesion has been present for any considerable length of time we apply radium interstitially instead of using a surface application. In the region of the eyelids, however, the tumours are rather more radio-sensitive than similar growths in other parts of the face, and the dosage can in consequence be decreased.

The idea once held, that radium treatment in the region of the eye was liable to damage the sight, has proved to be erroneous. In fact, radium treatment of lesions of the eyelids and conjunctiva has been most satisfactory. It produces less disfigurement than the use of surgery or X rays in the same regions, and is easier of application.

**Cataract.**—In only two of our cases in which radium has been used near the eye has any damage been done to the sight.

In one instance, that of an epithelioma of the left antrum, which involved the floor of the left orbit as well as the upper jaw and cheek, and which recurred twice, a cataract developed in the left eye about five years after the first radium treatment. This had the characteristics said to be typical of a radium cataract. The antrum, however, has remained healed for about six or seven years.

In the second instance, which can hardly be considered a similar case, a child, six months old, had a glioma of the retina, which, after responding moderately at first and remaining well for approximately a year, recurred, and ordinary doses of radium failed to affect it; as a final effort radium was given in a large dose, which resulted in destruction and subsequent removal of the eye.

I might mention that in this patient the other eye had already been removed for a glioma, and it was considered justifiable to take the risk of radium treatment in the remaining eye. This case has already been reported by Dr. E. O. Marks in *The British Journal of Ophthalmology* of November, 1932.

In the treatment of growths in the neighbourhood of the inner canthus the lachrymal duct may be damaged, not so much by the radium, if care is taken in placing the needles, as by the scarring resulting from the previous ulceration.

In advanced cases extension of the growth down the lachrymal duct necessitates surgical removal of the adjacent bony structures.

At one time we were under the impression that growths which had penetrated the full thickness of the eyelid or of the cheek were likely to be followed by a permanent fistula. This has also proved to be erroneous, as it is the exception to have a fistula follow treatment either of the cheek or eyelid.

In some regions, such as the muco-cutaneous junction of the lip, it is sometimes difficult to decide until after a biopsy whether the lesion is a rodent ulcer or a squamous or transitional celled carcinoma. A rodent ulcer usually commences on the skin surface and may extend onto the mucosa, but never commences on the mucosa; whereas a squamous carcinoma more commonly commences on the mucous surface, whence it may extend to the skin surface.

A frozen section enables one to decide immediately which variety is being dealt with, and if it is a squamous-celled carcinoma, the possible risk of glandular infection is explained to the patients and they are told that a surgical dissection of the glandular areas will diminish the later risks of the disease.

If the squamous epithelioma is of the hard, depressed type or has been present for a considerable time or has become extensive, then dissection of the glandular areas is strongly advised.

In some early cases of lip cancer the submental glands may be soft and palpable, but usually disappear after the reaction has had time to subside. If they are palpable and hard prior to radium treatment, we try to insist on glandular dissection as soon as the primary lesion has healed. The glands are examined microscopically, and if they are found to be infected we supplement the surgical dissection by the application of a radium collar or mould, and possibly also by X ray therapy.

In all lip cases, except those actually involving bone, we use interstitially applied radium. When, however, the bone of the jaw is involved we do not apply radium interstitially, but use a mould two centimetres thick.

Where the tumour actually involves bone, interstitially applied radium is more likely to be followed by bone necrosis than when a radium mould is used, although even with the latter we have had some cases of bone necrosis, in spite of every care to keep the dosage as low as possible.

The results of treatment when bone is already involved are most unsatisfactory, and in only a few instances can we claim a cure.

Late bone necrosis has also occasionally been seen. This has generally followed the extraction of a tooth, or some similar operation on the jaw, even as long as twelve months after the application of the radium. If any teeth need extraction, this should be done prior to the application of radium either to the lip or mouth.

We regret that we have not had sufficient radium for teleradium therapy, as it holds out better prospects than other methods.

*Late Necrosis of Tendons.*—Late necrosis of the tendons of the dorsum of the hand has occurred in approximately four cases following the interstitial application of radium, and in one case after the application of a radium mould.

The history of all these cases of late tendon necrosis is very similar.

The patients were all manual labourers who had been back at work for periods varying from two and a half to three years and who had then suffered a bruise over the site of the previous radium treatment, usually in the winter time. Soon after the injury the site of the old treatment broke down and sloughing of the skin and tendons followed. Fortunately all have healed, but with more or less disability.

There have also been two cases of early necrosis.

One was that of a melanotic sarcoma, when surgical removal had been supplemented by interstitial radium, and the other that of carcinoma in an old naevus, in which

the treatment was a combination of electric scalpel and radium. In both instances the treatment was followed by tendon necrosis. In both there was one feature in common, that is, the site of the lesion was on the anterior aspect of the leg, near the ankle joint, and was in close proximity to the extensor tendons.

The treatment of squamous epithelioma of the vulva or anus and Paget's disease of the nipple gives similar local results, but secondary spread is more liable to follow the disease in these areas than in the face and hands.

*Treatment of Glandular Metastases.*—Our figures show that metastases are relatively rare when squamous carcinoma is treated in its early stages (less than 1%); and they also show that when glandular metastases have occurred, approximately 75% of the patients have had surgical treatment prior to the use of radium.

In suitable early cases our figures conclusively show the wisdom of avoiding routine mutilation by the over-enthusiastic surgeon. However, when enlarged glands could be felt at the time of the radium treatment of the primary lesion, then surgical dissection of the glandular areas was always performed, if the patient consented to the operation.

The glands, after removal, are examined microscopically, and if they are found to contain any malignant cells, then a radium mould is applied to the neck, axilla or groin, as the case may be.

When complete surgical removal is found to be impossible, then a radium mould is applied, supplemented by radium therapy. In an occasional case of incomplete surgical removal, interstitial application of radium has been used. X ray therapy is also used occasionally as a supplement to surgical and other measures.

The results have not been satisfactory; only an odd patient with definite glandular involvement has made a permanent recovery, although temporary improvement generally takes place.

Although the local treatment of skin lesions is satisfactory, we have to admit that the treatment of secondary growths following any of the common skin lesions is just as unsatisfactory as is the treatment of secondaries following carcinomata in any other part of the body; and the only way by which we can improve our results is by educating the public to the advantages, first, of simple protective measures, and secondly, of early treatment, before the lesions have escaped from their natural barriers.

#### Statistics of Brisbane General Hospital.

I have attached the figures of the Brisbane General Hospital (see Tables I to V). For the period January, 1929, to June, 1933, approximately four and a half years, these have been tabulated according to the instructions received from the Commonwealth Department of Health, and this allows a sufficient time to have elapsed for the supposed cures to be of some significance.

TABLE I.  
Statement of Patients Treated Primarily by Means of Radium for Squamous Celled Epithelioma at the Brisbane Hospital during the period January, 1929, to June, 1933.<sup>1</sup>

Stage of Disease.	Number of Cases Treated.	Results of Treatment.								No Information.	
		Alive.			Died.						
		1	2	3	4	5	6	7			
First . .	30	26	2	—	1	—	—	—	—	1	
Second . .	167	121	7	1	20	1	—	—	—	17	
Third . .	96	59	4	—	15	2	4	—	—	12	
Fourth . .	55	12	4	—	4	2	9	—	—	8	
Fifth . .	42	16	—	—	2	7	3	3	—	11	
Total patients treated	390	234	20	5	42	12	16	12	—	49	

<sup>1</sup> The above include 193 cases of squamous carcinoma of the lip, commencing on the skin surface, as distinct from squamous carcinoma commencing on the mucous surface. The latter have not been included in these series.

TABLE II.  
Statement of Patients Treated Primarily by Means of Radium for Transitional Celled Epithelioma at the Brisbane Hospital during the period January, 1929, to June, 1933.

Stage of Disease.	Number of Cases Treated.	Results of Treatment.								No Information.	
		Alive.			Died.						
		1	2	3	4	5	6	7			
First . .	1	1	—	—	—	—	—	—	—	—	
Second . .	12	8	1	—	1	—	—	—	—	2	
Third . .	9	5	—	—	—	—	—	—	—	—	
Fourth . .	4	4	—	—	—	—	—	—	—	—	
Fifth . .	—	—	—	—	—	—	—	—	—	—	
Total patients treated	26	21	1	—	2	—	—	—	—	2	

TABLE III.  
Statement of Patients Treated Primarily by Means of Radium for Basal Celled Carcinoma at the Brisbane Hospital during the period January, 1929, to June, 1933.

Stage of Disease.	Number of Cases Treated.	Results of Treatment.								No Information.	
		Alive.			Died.						
		1	2	3	4	5	6	7			
First . .	156	144	7	—	20	—	—	—	—	15	
Second . .	162	113	5	—	24	—	1	—	—	19	
Third . .	72	44	6	—	12	—	2	—	—	8	
Fourth . .	18	8	1	—	3	—	5	—	—	1	
Fifth . .	2	1	—	—	1	—	—	—	—	—	
Total patients treated	440	310	19	—	60	—	8	—	—	43	

TABLE IV.

Statement of Patients Treated Primarily by Means of Radium for Hyperkeratoses at the Brisbane Hospital during the period January, 1929, to June, 1933.

Stage of Disease.	Number of Cases Treated.	Results of Treatment.							No Information.	
		Alive.			Died.					
		1	2	3	4	5	6	7		
First ..	114	87	2	—	5	—	—	—	20	
Second ..	—	—	—	—	—	—	—	—	—	
Third ..	—	—	—	—	—	—	—	—	—	
Fourth ..	—	—	—	—	—	—	—	—	—	
Fifth ..	—	—	—	—	—	—	—	—	—	
Total patients treated	114	87	2	—	5	—	—	—	20	

TABLE V.

Statement of Patients Treated Primarily by Means of Radium for Melanoma at the Brisbane Hospital during the period January, 1929, to June, 1933.

Stage of Disease.	Number of Cases Treated.	Results of Treatment.							No Information.	
		Alive.			Died.					
		1	2	3	4	5	6	7		
First ..	1	1	—	—	—	—	—	—	—	
Second ..	1	1	—	—	—	—	—	—	—	
Third ..	1	1	—	—	—	—	—	—	—	
Fourth ..	—	—	—	—	—	—	—	—	—	
Fifth ..	2	1	—	—	—	1	—	—	—	
Total patients treated	5	4	—	—	—	1	—	—	—	

An analysis of these figures gives the following information.

**Squamous-Celled Tumours.**—The number of squamous-celled tumours treated in four and a half years was 390, of which 193 were lip carcinomata originating in the skin. In Stage 2, one out of 167 patients developed and died from secondary growths. In the later stage nearly 6% died from secondary growths. A rough count of all the patients with squamous-celled carcinomata treated during the last eight years gives a total of 550. If we exclude the deaths from other causes and make an average of those about whom there is no information, the percentage of deaths from secondary growths is a little more than 4. The recurrences in all stages were slightly less than 5%.

**Transitional-Celled Tumours.**—For the same period to the end of June, 1933, 26 patients with transitional-celled tumours were treated. Of these, 21 are still free of symptoms at the end of the

period, one has a recurrence, two died of secondary extension, and no information was available about two patients. This type of transitional-celled carcinoma should be distinguished from that originating in the naso-pharynx. The latter is much more malignant and, although extremely radio-sensitive, is usually fatal because of rapid secondary spread.

**Basal-Celled Tumours.**—The patients with basal-celled tumours who were treated numbered 440 for a similar period ending June, 1933. The results of treatment in these cases were satisfactory, the percentage free from symptoms being 91. Recurrence amounted to 4·75% of the total number treated. In 2% of the cases treatment was given with the object of affording palliative relief only.

**Keratoses.**—The number of patients treated for keratoses was 114. There were two recurrences. Five patients died from causes other than those for which treatment was given.

**General Remarks.**—At the end of the year 1936, 654 in-patients had been treated with interstitially applied radium, and 1,831 treatments were given by means of surface applicators, making a total of 2,485 treatments in the year.

Pathological reports were obtained as follows: rodent ulcer, 25%; carcinoma of the skin, 60%; carcinoma of the lips, 55%. Pathological examinations were not made in the keratoses or in the very advanced carcinomata when the diagnoses were obvious. In the rodent ulcers treated by surface plates or moulds no sections were taken.

In the estimation of the percentage of patients free of symptoms, those who died from other causes were taken into consideration.

In my private work I have between 1929 and 1936 treated 1,165 patients with radium. Prior to that time all of my patients were treated with X rays.

The classification of patients treated by radium is as follows: rodent ulcers, 518; hyperkeratoses, 391; squamous carcinomata, 256.

As the combined total of both public hospital and private patients treated by me can be only a fraction of the total in this State, I am forced to the conclusion that skin carcinoma is extremely prevalent in Queensland, although some of my patients have come from areas outside of Queensland, namely, from the Gulf of Carpentaria, from Port Darwin and from the northern parts of New South Wales.

#### Acknowledgements.

It would be ungenerous of me to close without thanking those men whose assistance has made the preparation of this paper possible. They are: Dr. Clive Uhr, assistant honorary radium therapist; Dr. E. W. Casey, radium registrar; and Mr. B. W. Scars, of the Records Department of the Brisbane General Hospital.

#### CARCINOMA OF THE SKIN AND LIP.<sup>1</sup>

By E. H. MOLESWORTH, M.D.,  
Sydney.

On this occasion I do not propose to pursue further the discussion of the causation of carcinoma of the skin and lip, since the effect of sunburn as a provocative influence seems to have gained acceptance not only in Australia, but in Great Britain and in Germany.

The object of this paper is to press for the adoption of a line of treatment which, in my hands, has been extraordinarily successful for many years past.

I know very well that the majority of operators prefer to use radium, generally in the form of a plaque, for skin carcinoma, and radium implantation for treatment of carcinoma of the lip. With the

latter I have no quarrel, because the distribution of dose achieved by a good technique is sufficiently even to provide a cure in the great majority of cases. The use of a radium plaque, however, especially unfiltered, is open to the gravest objections, on the ground of the very uneven distribution of dose, even when the growth has penetrated only 0.5 centimetre. To achieve a curative dose at 0.5 centimetre depth, when using a radium plaque, even filtered with a whole millimetre of lead, it is necessary to subject the surface of the skin to a dose at least two and a half times that which must be delivered at the advancing edge of the tumour 0.5 centimetre below that surface. This disproportion is increased to five to one when the tumour is 1.0 centimetre deep. If the plaque is unfiltered, the disproportion becomes very much greater (experimental proof). It is this fault on the part of a radium plaque that makes it necessary to deliver a surface dose, which causes a very severe crusting reaction and which necessitates either preliminary curettage or repetition of the treatment more frequently than is required when radium implantation or X rays are employed. The practice of using an unfiltered plaque in the treatment of skin carcinoma should be completely discarded. Even with a heavily filtered plaque, preliminary curettage should be done if the depth of the growth is 0.5 centimetre or more. This introduces the necessity for an anaesthetic and for an operation, and any such suggestion is liable to result in the patient's postponing the treatment in the hope that the diagnosis is mistaken and that an operation may be avoided.

I do not propose to go into the subject of the distribution of radium needles, or of the use of heavily filtered radium at a distance—all that I want to do in this paper is to point out that the superiority of an X ray tube over a radium plaque is easily demonstrable, theoretically and in practice. With the use only of radiation of moderate hardness (120 kilovolts, one millimetre of aluminium filter), and allowing for absorption as well as for divergence of the beam, the dose delivered to the surface is to the dose delivered at 1.0 centimetre depth as four is to three, if a focal skin distance of 30.0 centimetres is employed. With longer distances and harder radiation the disparity is even less. Hence the surface, if X rays are employed, need not be subjected to anything like the magnitude of the dose when a radium plaque is used. Of course, a sufficient dose has to be delivered; and as this amounts to not less than double the maximum tolerated dose, the area of exposure must be limited to the tumour and to a safety margin of tissue surrounding the palpable growth. A deep dusky red reaction with oedema and crusting results. This begins about ten days after the exposure and lasts for three weeks; but at the end of a month from the exposure, the reaction has already almost faded and the surface is covered with intact epithelium. The action continues until three months have passed, at which time the patient is brought back for inspection. Provided a dose represented by two to two and a

<sup>1</sup> Read at the eighth Australian Cancer Conference, Canberra, April, 1937.

half times the normal tolerated dose is delivered, it is not necessary (more than once in fifty cases) to repeat the treatment. The great advantages of this method are that it is comparatively inexpensive, that the dose can be delivered in about twenty minutes, and that the patient can return to his farm or to his home at a distance on the same day that the treatment is delivered.

When radium needling or radium at a distance is used, it is necessary to put the patient in hospital and to keep him there for a week or more, so that discomfort, loss of time and greater expense operate to the disadvantage of radium implantation or the use of radium at a distance, as compared with a single dose delivered by means of an X ray tube.

I should be afraid to mention how many thousands of skin carcinomata I have treated by this method during the past twenty years. There is very little difference in the response to this form of treatment by a squamous-celled as compared with a basal-celled tumour. It is true that a 10% larger dose is advisable for a squamous carcinoma than in treatment of a basal-celled growth, but the reputation of a squamous carcinoma of being harder to cure by radiation than a basal-celled tumour is due mainly to the fact that the squamous growth has almost always penetrated to a greater depth than a rodent ulcer of similar surface extent. The ineffective depth dose provided by a radium plaque is responsible for failure, rather than the resistance of the individual cells of a squamous carcinoma to a given dose of radiation. As an example of this, I am able to record that carcinomata on the back of the hand and on the forearm, which are, with the rarest of exceptions, squamous in type, provide no more difficulty in treatment with X rays than the most obvious basal-celled growth on the face. On the back of the hand especially X rays have a great advantage over radium implantation, because of the difficulty of avoiding sloughing of tendons or of tendon sheaths when a carcinoma in the region is treated by implantation. In this situation X ray treatment and treatment by highly filtered radium at a distance are the only two that should be considered.

In both varieties of tumour occurring in the skin, as elsewhere, tinkering with insufficient dosage is fatal. The growth is either not affected, is only temporarily benefited or, what is worse, it is rendered radio-resistant, necessitating surgical measures for its cure. This tinkering is very common, especially in country centres. The dose delivered by radium plaques in such places is frequently not even enough to cause an erythema. Such methods not only do no good to the patients who are subjected to them, but bring radiation treatment into undeserved disrepute. Surely, if a practitioner in a country centre proposes to use X rays or radium in the treatment of skin cancer, he will recognize that, even if only for his own sake, he should spend a month or two in learning the techniques which are required for the purpose.

In the use of X rays, if we take 600 r as representing the maximum tolerated dose of 120 kilovolt radiation, the dose required to provide a cure in the skin carcinoma lies between 1,250 and 1,500 r.

In this connexion, and also in the treatment of carcinoma of the lip, I wish to point out that there is no advantage to be gained in using ultra-hard X rays, given off, for example, at 200 kilovolts, and filtered through one millimetre or more of copper. Even when a sufficient dose is delivered, except in the treatment of tumours which have already penetrated very deeply to involve the bone or other deep structures, the results are in no way superior to those obtained when radiation given off at 100 to 120 kilovolts is employed. Moreover, the cumbersome and immobile nature of deep X ray tubes makes it difficult or impossible to direct the beam as accurately as is desirable, especially when the growth is in the neighbourhood of the eye or the lip. The protection of surrounding skin is also very much more difficult when a deep X ray tube is employed. Nor does there seem to be any necessity to distribute the dose over a long period, as in the treatment of deep carcinoma, when neighbouring vital organs cannot be excluded from the influence of radiation and must be spared a dose which would be damaging to them. On the score of expense, an ordinary superficial X ray tube is much to be preferred to a deep X ray tube.

The use of the Chaoul soft radiation also implies a long period of treatment at much greater expense to the patient, while the results obtainable could not be better than those which regularly follow the technique which I am advocating.

I say this advisedly, because if advanced tumours and those involving bone or glands are excluded, practically 100% of cures is obtained regularly by the X ray technique here described.

#### Carcinoma of the Lip.

Radium implantation as a means of treatment of carcinoma of the lip has been established so long and has provided such uniformly good results that it would seem unnecessary to seek any other form of treatment. The dose required is one which causes erosion on the mucous membrane surface and a deep oedematous and sometimes crusting reaction on the skin surface. The disadvantage of radium implantation, however, is that in addition to the the discomfort of having the needles embedded in the tissue surrounding the growth for a week or more, the patient must necessarily stay a week in hospital, unless radon is used instead of radium element. With private patients at any rate this necessity means considerable extra expense, not to speak of the loss of time away from work which is occasioned. In years gone by I frequently met with unwillingness on the part of the patient to sacrifice the length of time required, and it was only by stressing the great danger that I was able at times to overcome the patient's objection. It was owing to such objection a good many years ago that the X ray technique which I have evolved was first put

into practice. A patient with a large carcinoma of the lip flatly refused to remain in Sydney another day, so I thought of trying to treat the lip with X rays from the inside and then from the outside of the lip. The result obtained, though the case was one of the most advanced I have treated in this manner, was almost perfect. As a result of this, other patients, who prior to this would have been treated by radium implantation, were treated by X rays. I have described the technique in a paper published in THE MEDICAL JOURNAL OF AUSTRALIA of June 9, 1934.

Briefly the technique consists in evertting the lip and fixing it in this position by means of strapping and lead rubber protection material, and then of delivering to the mucous surface thus exposed a dose equivalent to two-thirds of the total amount desired. The lip is then allowed to fall into the natural position and a similar dose is delivered to the outer surface, a margin of 0·5 to 1·0 centimetre of apparently healthy tissue, according to the size of the growth, being included. The result of this dose is the occurrence of about the same degree of reaction that is provided by the necessary dose delivered by radium implanted in the surrounding tissue, namely, erosion of the mucous membrane and a dusky, oedematous and sometimes crusting reaction of the skin surface. This reaction has almost completely disappeared four to five weeks after the delivery of the dose, and the disappearance of the tumour and healing of any ulcerated surface is complete and prompt. In no single case has the growth failed to resolve within three months, generally within two months. On two occasions, however, marginal recurrences appeared, owing to the inclusion of an insufficient margin of apparently healthy tissue. Of course, this technique can be applied only when there exists a sufficient margin between the lowest line of penetration of the growth and the reflection of the mucous membrane on to the alveolus. This, for practical purposes, means that the palpable growth must not have extended more than 1·0 centimetre below the surface of the lip. In those cases in which the growth has extended near to the reflection of the mucous membrane on to the alveolus, it is imperative to employ radium implantation. The actual dose of X rays to be delivered is 750 to 800 r to each surface of the lip. The tube is held at a distance of 20·0 centimetres from the surface, and the surviving radiation on the opposite surface of the lip is approximately two-thirds of the dose received on the first surface of impact, that is, 500 to 600 r, or, taking both exposures into account, a total of 1,250 to 1,400 r.

I can unhesitatingly recommend this technique to all concerned. Within the limits of its application it is not a whit inferior to radium implantation in the results provided. To show that this is not a personal finding only, Dr. Belisario (THE MEDICAL JOURNAL OF AUSTRALIA, January 16, 1937) has used this technique in 50 cases, with results exactly similar to those obtained by me. We have, therefore, a very large number (over 250 in all) of cases

with uniformly successful results. The patient is put to no inconvenience, and the treatment takes less than half an hour. The patient can return the same day to his home in the country, and, except for the period of reaction from the tenth to the thirtieth day after the treatment, no discomfort is experienced. Even the soreness due to erosion of the mucous membrane is not so pronounced as after radium implantation, because there has been no mechanical trauma to the tissues. The end result is often so good that one can hardly tell where the lesion has been, though sometimes the loss of tissue determined by the growth itself may leave a small concave area at the edge of the lip.

I now come to a point upon which I have been challenged recently, namely, the question as to whether regional glands are to be removed when not palpable. Even the authenticity of my statement that this originated in the Institut du Radium in Regaud's clinic, Paris, has been described as being possibly hearsay. This astonished me, because in radiological circles at any rate the doctrine which I uphold has been so widely promulgated during the past ten years as to have become commonplace. In any case, my own information came direct from the Institut du Radium, from the lips of Dr. Le Roux Berger, in the course of a demonstration of cases given at the institute while I was in Paris during 1927. Dr. Le Roux Berger shared with Dr. Lacassagne a series of demonstrations, and was giving not his own opinion, but the considered doctrine adopted for some time past in the institute. This teaching has been repeated so many times, in so many languages, that it seems superfluous to give specific individual references in support of a doctrine so long and so widely spread. At the institute it was found, on a survey of a large number of patients in whom the tumours were of all sizes and in all stages of development, that only 20% of those who did not show involvement of glands at the time of treatment of the primary growth subsequently provided recurrences in these glands. It is well known, of course, that carcinoma of the lip often extends widely in its original situation without the glands being involved. If one excludes these, as one has to for the purpose of selecting cases for the X ray technique, the number of cases which show recurrence in the glands is very much less indeed. In fact, in my series of nearly 200 there have been only two cases, and in Dr. Belisario's series there has been only one case of subsequent glandular involvement. Therefore, when Dr. E. S. Meyers combats the doctrine of non-interference with the glands unless they show definite enlargement, he is advocating the use of operative measures of which the death rate exceeds the incidence rate of carcinoma in the glands. Surely it is obvious that such measures are utterly unjustified in the light of modern knowledge. Moreover, we have all had the experience of seeing enlarged and hardened glands resolving when the septic contamination is eliminated with healing of the primary growth. Therefore, even when glands

are palpably enlarged, operative measures should be postponed until the primary growth has healed. Even if there are cancerous deposits, the elimination of the septic element from the field of operation will provide a lower operation mortality. Dr. Meyers quotes some six or seven cases in which secondary gland involvement has followed the cure by radium implantation or by surgical excision of the primary growth. This is no news. We all know that glandular involvement occurs in some proportion of the cases of carcinoma of the lip, especially if the growth is advanced; but in the early cases this proportion is very small—in my series not more than 1% to 2%. Moreover, the psychological factor here comes in strongly once more. If men with carcinoma of the lip have reason to fear that application for treatment will mean a serious operation for the removal of the glands, a notable proportion of them will postpone their application in the hope that their fears are groundless and that they will be able to avoid operation.

I want to impress upon all that this is a most important consideration, and that if we hope to persuade the greatest possible number of patients to apply for treatment in the earliest stage at which the growth is recognizable, we must remove from their minds the fear of operation.

Even if glands do subsequently become involved, they can be removed at little if any more risk than if the operation is done soon after the primary growth is treated.

My practice is to tell the patient and his own doctor that the patient must remain under observation not less frequently than every two months during the first year and every three months during the second year. In addition, the patient is told that if he can feel any kernels under the jaw or in the neck he must go immediately to his own doctor.

So far from this doctrine doing harm, as Dr. Meyers seems to imagine, I am sure that it will provide a much larger proportion of ultimately successful results than a system which advocates the dissection of the gland-bearing area of the neck in all cases of carcinoma of the lip. If I had a carcinoma of the lip myself, I can imagine nothing that would persuade me to permit such an operation, unless glands were palpable.

Dunedin Hospital from 1930 to 1935 inclusive. In one of the 72 cases under review the primary lesion on the lip was treated with a surface radium application only; in two cases the growth was treated by both surface and interstitial application of radium, and in the remaining 69 by the insertion of radium needles into the tissues of the lip. That is to say, in 71 of the 72 cases the interstitial radium method was used. During the period under review (six years) there were some slight variations in the radium treatment, not so much in the actual technique of needle insertion as in the matter of the distribution of the needles and the dosage of radium applied. Substantially, however, the radium treatment was fairly uniform, and the slight modifications in technique and dosage were not sufficient to detract materially from the statistical value, if any, of this report, or from the value of the interstitial application of radium as one of the accepted and efficient methods of treatment in labial carcinoma.

The cases were divided into six year-groups, and each year-group was further subdivided into two categories: (a) the early cases and (b) the more advanced cases, reference being made, of course, to the stage of development of the neoplastic process. The "present condition" of the patients reviewed must be taken to be their condition as observed in May of last year (1936), which was shortly before I severed my connexion as radiotherapist with the Dunedin Hospital. A lesion was regarded as "early" when it was either quite superficial or was not more than one centimetre in diameter, and showed no clinical evidence of malignant extension to the cervical lymph nodes. That is, all the early cases were Stage I cases: a primary epithelioma with no apparent involvement of the regional nodes; and of the total of 72 cases, 57 (or 79%) were classed in this first group. The remaining 15 cases were grouped as "more advanced", and in this second category was placed any case in which there was clinical evidence of malignant cervical nodes when the patient was first seen (that is, all frank Stage II cases), as well as any lip growth which was more than one centimetre in diameter, no matter whether or not the cervical nodes appeared macroscopically to be involved in the neoplastic process. So, briefly, the 57 early cases were all in Stage I; whereas the 15 more advanced cases were in either Stage I or Stage II, depending on whether the cervical nodes showed clinical evidence or not of involvement.

It is necessary in these cases to distinguish, so far as is possible clinically, between malignant and non-malignant enlarged cervical nodes, for the presence of enlarged lymph nodes when a lip epithelioma is first seen, does not necessarily imply malignant invasion of the nodes; they may be enlarged simply as a result of superadded infection of the primary lesion. But it is by no means easy always to make the distinction, for what has sometimes looked and felt, clinically, like malignant nodal invasion, has proved not to be so after operation and microscopy. The reverse, of course, also

#### INTERSTITIAL RADIUM TREATMENT IN CARCINOMA OF THE LIP: A REVIEW OF SEVENTY-ONE CASES.<sup>1</sup>

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THIS is a report of 72 cases of squamous-celled labial carcinoma treated primarily with radium at

<sup>1</sup> Read at the eighth Australian Cancer Conference, Canberra, April, 1937.

holds true. So I think it is a safe rule that, whenever there is the slightest doubt of the involvement in the neoplastic process of the enlarged lymph nodes, they should be regarded as malignant and should be excised as thoroughly as possible. This should be done five or six weeks after the removal of the radium needles from around the primary growth. Actually, of the 57 Stage I patients in this series, no fewer than 17 (30%) showed the presence, when first seen, of enlarged, but clinically non-malignant cervical nodes. These 17 patients were kept under close and regular observation at the follow-up clinic, and only one reported later with definitely proved secondary malignant extension in the neck.

Our attitude in Dunedin changed during the period under review towards the vexed question of routine block dissection of the cervical nodes in all cases of labial carcinoma (whether showing palpably malignant involvement or not). In the earlier years the cervical nodes, whether palpable or not, were removed surgically as a routine measure after the completion of the local radium treatment; and in most cases the excised nodes were examined microscopically. There were ten cases classified as "early" in which the nodes were treated in this way and examined; in no single instance were the nodes found on microscopical examination to contain malignant cells. In other words, in these ten early cases the microscope confirmed the clinical diagnosis.

In the later years of the period under review we followed the practice (now the rule in many tumour institutes and clinics) of carrying out a block dissection of cervical nodes only when there were grounds for believing that the nodes were invaded by the growth. This practice necessitates, of course, the rigid observance of a regular periodic follow-up system. Only in this way can the earliest clinical evidence of nodal invasion be detected and the obvious surgical treatment at once instituted. This is, and can be, the only meaning of the so-called "wait and see" policy with regard to cervical nodes in labial tumours; but it is not always realized that in this policy the seeing is more important than the waiting. It would really be better to describe this attitude as the "watch and wait" policy. But I shall revert later on to this important aspect of the treatment of lip tumours.

#### *Analysis of Cases and Results.*

Of the 57 patients in this series with early tumours, 10 (as mentioned above) underwent the routine treatment of block dissection following radium treatment of the lip lesion. The remaining 47 patients, belonging to the later years of the period, were treated primarily with radium needles and were then closely observed at regular intervals (the "watch and wait" idea). It is interesting and suggestive to note that in the whole 57 early cases only four patients had developed nodal metastases up to June of last year (the close of this review). But as in four of these early cases the patients could

not be traced after a certain time, I shall deduct these and leave a total of 53 early cases. We know that in only four of these 53 cases was there evidence of nodal extension up to June, 1936; this is approximately an incidence of 1 in 13, or about 7.5%, not really a very high percentage for the period in question. It is even more interesting to note that of the four patients who subsequently showed nodal invasion, two were included in the ten who had undergone routine nodal excision in the earlier years of the period. That is, two out of ten of those who had had the routine block dissection (so strongly advocated still in many surgical quarters), even despite the surgical interference (or perhaps on account of it—who knows?), developed malignant nodal involvement in the neck; whereas, of the other 43 followed-up patients, who were simply treated locally and observed closely by the "watch and wait" method, only two, or about 4.6%, showed evidence later of cervical extension. All this (and you will notice the evidence is both positive and negative) is, I think, most instructive and suggestive, and a strong argument for the "wait and see" protagonists as against the "routine block dissectionists".

In the majority of the 72 cases in this series the clinical diagnosis (seldom in doubt in carcinoma of the lip) was confirmed by biopsy, a section of the primary growth being taken for microscopy just after the insertion of the radium needles. The sections were typed in every case, according to Broders's well-known classification of the squamous-celled epitheliomata, which, as you all know, is based on the relative degree of cellularity of squamous-celled growths. This typing, or classification, is, of course, more or less arbitrary, but it has its value not only in the matter of prognosis, but also in the assessment of the probable response of any particular tumour to radiotherapy. Type I, for example, is the least sensitive to radiant energy and is really the only type of lip tumour (and that an uncommon one) in which the idea of primary surgical excision should be entertained; and even in these cases the patients should have the advantage of pre-operative irradiation, either by radium or X rays. In all other types of lip epithelioma, no matter whether they are early or advanced, some form of radiotherapy is, I think, the treatment of choice for the primary lesion, whatever be done later on to the cervical nodes. I think it matters little which modality (X rays or radium) is used; the clinical result in most cases is excellent and the cosmetic result far superior to the permanently scarred disfigurement of surgical excision. Some people prefer X ray therapy, either the ordinary method or the more recent form in which the low voltage Chaoul tube is used; others prefer radium therapy, either in the form of a surface application or interstitially by insertion of radium needles.

Like Broders, we found the extreme types, I and IV, least common in our series, the intermediate types, II and III, occurring with much greater

Results of Treatment by Radium of 72 Patients.

Year Groups.	Group I.—Early Cases.					Group II.—Advanced Cases.				
	Alive and Well.	Alive with Disease Present.	Not Traced.	Dead.		Alive and Well.	Alive with Disease Present.	Dead.		Total.
				Of Cancer.	Of Other Disease.			Of Cancer.	Of Other Disease.	
1930	1	—	—	—	—	1	—	—	—	2
1931	9	—	1	2	3	—	—	2	—	17
1932	7	—	1	1	—	—	—	—	—	11
1933	8	1	—	1	—	—	—	1	—	13
1934	8	—	2	—	1	—	—	1	—	14
1935	9	2	—	—	—	—	1	1	—	15
Total	42	3	4	4	4	9	1	5	—	72

frequency. And of these latter, Type II preponderated and so may be considered to be the commonest type of labial epithelioma.

The results of treatment in the 72 cases are summarized in the accompanying table.

It will be seen that among the 57 early cases four patients were untraced at the close of the review (June, 1936). In the remaining 53 cases, 42 patients, or 79%, were alive and well, three, or 5·6%, were alive, but with disease present, four, or 7·5%, had died of their malignant disease, and a similar number had died of other disease. In the 15 more advanced cases, nine patients, or 60%, were still alive and well, one, or 6·6%, was alive with the disease present, and five, or 33·3%, had succumbed to the disease. Of the total number of patients (72) it will be seen that 51 in all, or 70·8%, were alive and well in June, 1936; that four only, or 5·5%, were alive but with active signs of the disease; that nine, or 12·5%, died of malignant disease; that four, or 5·5%, died of other disease; and that another four were not traced. Finally, among the 72 patients treated with radium, local recurrences occurred during the period in six, or 8·3%, and these were treated either with further radium or else by surgical excision. Also there were two Type I cases in the series (2·8%) in which the patients did not respond well to radium and so were operated on.

#### Details of Technique.

The average dose of radium used throughout this series was something between 1,100 and 1,200 milligramme-hours, and during the last year of the period (1935-1936) we were using an average dose of seven milligrammes of radium element for seven days, or 1,176 milligramme hours. In the earlier years we tried inserting one or two needles of small intensity into the mucosal aspect of the lip, but abandoned this after a year or two, as the reaction was sometimes out of proportion to the result obtained. Later on we found that the result was just as satisfactory, from both the clinical and cosmetic viewpoints, if the needles were inserted simply into the cutaneous aspect of the lip.

The usual method of insertion of the radium needles was somewhat as follows: four to six

(usually five) one-milligramme needles were disposed in series, in the form of a semicircle, beginning just below the lip margin, about two centimetres from the edge of the lesion and finishing up the same distance from the growth on the other side. Then a two-milligramme needle was inserted parallel to the lower edge of the lesion and at about one centimetre from it. The needles had a screenage of 0·6 millimetre of platinum; this screens off practically all the  $\beta$  rays and leaves an almost pure  $\gamma$  irradiation, the thing we require in radium therapy. Each needle was then secured in position by a strong linen suture, which ran for about one centimetre along, parallel to the needle, and so moored it effectively. The sixth or two-milligramme needle lay then between the growth and the surrounding semicircle of one-milligramme needles. This circumferential distribution is, I think, the most effective, and there is no need at all, in my opinion, to insert needles into the actual growth itself; in fact, such a procedure is, I believe, harmful rather than helpful, damaging the neoplastic cells just like the surgeon's scalpel does when a tumour is incised, and so tending to induce, as Gye believes, increased activity and dissemination of the malignant cells.

Also, of course, by inserting the needles into the surrounding more or less healthy tissue, not only do we achieve the purely destructive or mechanical effect of the radiant energy on the tumour cells, but we also stimulate the surrounding and supporting "tumour bed", as it is called, and induce the even more important biological action: vaso-dilatation, hyperaemia and probable extravasation of blood from the very small vessels, with resultant induction of what Cramer calls the "macrophage reaction", with its sequence of monocyte-fibroblast-fibrocyte and fibrous tissue, all of which play such an important part in the ultimate healing process of any malignant tumour. This biological action or effect is especially well seen in the healing of a lip epithelioma, in which the neoplasm gradually disappears, to be replaced by a soft and pliable scar. Fibrous tissue replaces neoplastic, and at the site of growth perfect reepithelialization occurs, so perfectly in fact that after a little while it is difficult to say just where the lesion was. There is no need,

however, to stress the very satisfactory healing of these labial epitheliomata following irradiation by either X rays or the  $\gamma$  rays of radium; like the basal-celled epitheliomata of the skin, these squamous growths of the lip are some of the most satisfactory tumours that we treat in the whole realm of radiotherapy. Their treatment is successful simply because such tumours of the lip satisfy, as a rule, those essential prerequisites of successful radiotherapy, about which I wrote more fully in a recent paper. Briefly these important prerequisites may be enumerated as follows: (a) tumour radiosensitivity; (b) satisfactory state of the tumour-bed; (c) absence of infection; (d) adequate irrigation or blood supply; and (e) adequate drainage or lymphatic supply. Now, with the occasional exception of (c), most lip tumours of the squamous-celled type conform to these requirements. All, except perhaps the uncommon Type I, are quite radio-sensitive; all have an excellent and quite soft and comfortable tumour-bed, with very good blood supply and drainage; and the minority, which have superadded infection, may soon be cleaned up by simple antiseptic methods before the radiant energy is applied. It is essential, too, for the complete success of radiotherapy in these cases not to disturb or interfere with these important factors, or prerequisites, until the irradiation has exerted its full effect. This is the reason why radiotherapists insist so strongly on a period of something from a month to six weeks being allowed to elapse between the cessation of a course of pre-operative X radiation and the surgical operation (as, for example, in a case of breast carcinoma), and again, between the removal of the radium needles, in a case of lip carcinoma, say, and the block dissection or excision of the cervical lymph nodes, when this surgical procedure is indicated.

Malignant or secondarily involved lymph nodes, on the other hand, present a more difficult problem from the viewpoint of the radiotherapist, for in most cases, and certainly in the case of malignant cervical nodes secondary to an epithelioma of the lip or tongue, they do not satisfy nearly so well the above-mentioned prerequisites. The actual malignant cells in the nodal deposits are in most cases more radio-resistant than those of the primary malignant focus or lesion; and moreover they exhibit an obvious lack of supporting tissue; in short, theirs is a poor and unsatisfactory tumour-bed. When one adds finally to these, their relatively poor blood supply, one begins to realize why the all-too-common extensions of malignant processes to regional lymph nodes are so difficult to treat by radiotherapy. They do not satisfy, in a word, the essential requirements of successful radiotherapy.

Many radiotherapeutic methods have been tried in the treatment of malignant cervical nodes: the insertion of radium needles or radon seeds around the affected nodes; the application of the so-called radium collar, a surface method; and finally such forms of external irradiation as ordinary deep

X rays or the intense  $\gamma$  ray bombardment from that concentrated source of radiant energy known as a radium bomb. In the earlier years of the period under review we employed Columbia paste radium collars quite often, combined with the interstitial needling of the primary lesion; but, as members of a clinic, we were always somewhat doubtful of the efficacy of the radium collar (the reasons just mentioned strongly support this opinion). In the later years of the period, therefore, the use of this method for the cervical nodes was practically discontinued. Reports from a number of clinics abroad rather suggest that such nodal extensions respond better to the more intense energy of the radium bomb.

#### Comment.

Enough has been written, I think, in this paper to support the contention that radiotherapy is the primary indication in the majority of cases of epithelioma of the lip; that is, they should be treated initially by some form of radiotherapy, no matter what may be done afterwards to the cervical lymph nodes. This series of 71 cases shows what can be done in labial carcinoma by the interstitial method of radium needling; and for many types of case, especially the early cases, I am inclined at present to regard this as the most suitable method. When one can obtain, as one does, such excellent results, both clinically and cosmetically, from the irradiation of labial carcinomata, why should the patient be submitted to the more serious and disfiguring operation of surgical excision? In most cases the insertion of radium needles can be done with a local anaesthetic; and this is another argument in its favour, especially in elderly patients. Therefore, in my opinion all epitheliomata of the lip (except perhaps the few Type I cases, and even for these pre-operative irradiation is advisable) should be subjected to radiotherapy, irrespective of their stage of development. The cervical lymph nodes should be treated surgically only when there is definite or suspicious evidence of their involvement. This implies, as I have said above, close and regular observation of every patient and the carrying out of a rigid "watch and wait" policy, in which the watching and observing of the patient's clinical condition is more important than the waiting.

Apropos of this, in a recent paper, in which he strongly deprecates this "wait and see" attitude, Meyers, of Brisbane, records seven cases of lip carcinoma in support of his advocacy of routine block dissection. In six out of his seven cases the average period elapsing between treatment of the primary lesion (by either surgery or radium) and the medical observation of cervical nodal involvement was eleven and two-third months—almost a full year. As no mention is made at all of these patients having been kept under observation in the intervening period, one rather assumes (subject, however, to correction) that they were not so observed. It hardly seems likely that these patients would have reached the fairly advanced stage of nodal involvement that they did reach, had they been watched

carefully and regularly following the primary treatment. In short, Dr. Meyers's cases, as described, suggest more waiting than seeing, and stress (without perhaps his intending it) the great importance of keeping all such patients under the closest observation, in order to discover the nodes in an operable stage, if they do become affected. His seventh case, one of very rapid extension to the cervical nodes (the neck condition was inoperable within ten weeks of the primary treatment) proves little; for even a block dissection would, I think, have been powerless to stem the malignant tide in such a fulminating case.

There are two final points that I should like to make before concluding this short paper, and they both have reference to the comparisons so often made these days as between the purely ablative or mechanical method of surgical excision in the treatment of malignant disease and the more biological (and therefore more logical) method of irradiation. The first point has to do with the relationship between radio-sensitivity and degree of malignancy, the general rule being remembered that the more cellular a tumour, the more radio-sensitive and also the more malignant it is. This means simply that the most sensitive tumours are as a rule the most malignant; and so, though they are more suitable relatively for radiotherapy, their prognosis is definitely worse than in the more radio-resistant group, which are, of course, more suitable for the scalpel of surgery.

The other point is that, when the results of surgery and radiotherapy are compared, any alleged comparison will not carry conviction unless the tumour under treatment is in the same stage of development when treated by surgery as when irradiated. I mean that it is no good excising a large number of Stage I and operable epitheliomata of the lip and then irradiating another series of lip tumours which are in Stage II (that is, with secondary nodal involvement), or which are even quite inoperable, and then presuming to compare the results in these two groups of cases. In these circumstances one of the important bases of comparison, that of the stage of the malignant growth, has been ignored, and such a "comparison" is worthless. In the series that I am reviewing, by far the greater proportion of the cases treated by radium (approximately 80%) were early or Stage I cases, that is, early and operable from the surgical point of view. These 57 Stage I cases could, therefore, be legitimately compared with a similar number of Stage I lip tumours, in which the ordinary surgical excision was performed. Too often still do we see brought up for so-called comparison a series of early Stage I, and so operable, cases which have done well with surgical ablation, and side by side with these a series of advanced inoperable cases in which the results after irradiation have naturally enough fallen far short of those in the series treated by surgery. In other words, it is only when we irradiate early or at least operable tumours and observe the results that we can have

any common basis for sound comparison with the quite well-known results of surgical excision.

I should like finally to emphasize that these two points be always remembered in any critical assessment, in tumour therapy generally, of the relative merits of ablation by the surgeon's scalpel and irradiation by the radiotherapist.

#### Acknowledgement.

In conclusion I should like to express my thanks and indebtedness to Dr. N. C. Speight, Registrar of the Tumour Consultation Clinic at Dunedin Hospital, for his care in going over the results of treatment in the cases under review, and for his kindness in supplying and allowing me to use in the preparation of this report the material that he got together.

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#### Reviews.

##### ELECTROCARDIOGRAPHY.

TEXT-BOOKS on electrocardiography, like many others, can be arranged in ascending order of detail, so that a reader may penetrate the subject to whatever depth he pleases. Dr. Bailey Carter's "Fundamentals of Electrocardiographic Interpretation" is prefaced "as an attempt to aid the beginner in acquiring a practical working knowledge of the subject"; but any beginner after complete digestion of its lessons would find himself in possession of most of the present-day knowledge of the subject.<sup>1</sup> The arrangement is good, the text is pithy, and the illustrations are most adequate, even to the point of superfluity, which, however, is not a disadvantage in this field. Some of the reproductions are over-reduced so that "fine slurring" described in the legend is virtually invisible to the reader, who nevertheless, by way of reparation is saved by the length and descriptive character of the same legend, from the wearisome task of turning back and forth from text to picture. The author has no hesitation in entering into the aetiological, anatomical and therapeutic aspects of cardiology; but again, these departures from the main theme are justified, because they focus the student's attention on correlated facts and assist him to "pigeon-hole" cardioigraphic appearances with his remaining cardiological information.

Dr. Carter has drawn freely, and with proper acknowledgement upon the medical articles and books which have constituted well-known footprints in cardiology. He intrudes his own conclusions but rarely. The reader gathers that the author is not yet prepared to believe that Lewis's views as to the site of origin of ventricular extra-

<sup>1</sup> "The Fundamentals of Electrocardiographic Interpretations", by J. B. Carter, M.D.; 1937. London: Baillière, Tindall and Cox. Demy 8vo, pp. 341, with illustrations. Price: 20s. net.

systoles and of bundle branch block have been disproved, or that serious heart disease may follow unrelieved hyperthyroidism in the absence of other pathogenic factors. He insists upon the importance of serial electrocardiograms in the diagnosis and management of patients suffering from coronary occlusion, and gives a balanced statement as to the over-emphasis on the importance of chest leads which has lately coloured many articles on this subject.

There are very short but separate chapters in the latter half of the book upon doubtful points, which, however, are vital to the practical cardiographer. Synopses of current opinion are given upon the significance of a large Q wave in Lead 3, on the electrocardiographic abnormalities in arterial hypertension, on the prognostic significance of T wave negativity, on the effects of digitalis, on the dying human heart *et cetera*. A summary of electrocardiographic findings in various clinical conditions, from congenital heart disease to myxoedema, constitutes one of the most valuable sections of the book for the practising clinician. A good chapter at the end on the "Clinical Value of Electrocardiography" is almost a faithful repetition of one at the commencement of the book, entitled "The Value of Electrocardiogram in Clinical Practice". A curious appendix is a "glossary" of cardiological terms wherein "The Apex Beat", "Coronary Arteries" *et cetera* are gravely defined, along with their more technical fellows. The relevant electrical and physical bases of cardiology are adequately and simply explained, and the work ends with an excellent bibliography of the whole subject.

Yet the book, with all its redundancy, is a most acceptable, readable and first-class summary of the best opinion on this important method of cardiac examination. It can be confidently recommended to students and all interested practitioners, whether beginners or competent cardiographers.

#### BLOOD CULTURES.

On receiving for review the third of the Baker Institute (Melbourne) monographs, "Blood Cultures and their Significance", by Hildred M. Butler, B.Sc.<sup>1</sup> we consulted the index of the Medical Research Council's nine-volume "System of Bacteriology" and found there no reference to this, one of the most important diagnostic procedures in bacteriological technique and clinical medicine. Another recent two-volume text-book of bacteriology gives the method scanty mention on the whole, and none at all in connexion with some diseases on which important, indeed decisive, information may be obtained by blood culture. These examples are typical of the lack of knowledge amongst bacteriologists concerning a diagnostic and research measure of the greatest value and importance; they will not realize what they have hitherto missed until they have read this book. In this way alone the monograph is particularly welcome. It has, however, a much greater significance, for, like its extremely distinguished predecessor, Dr. Willis's book on tumour spread, it places a well-defined department of medical science on a scholarly scientific basis. No doubt it does not say the last word on the subject, but without doubt any future contributor to this subject will have to start where Miss Butler leaves off; this will call for more than an ordinary grasp of the matter, since a critically accurate work of over three hundred pages with well over five hundred references is no mean contribution and one that will be hard to excel. A check reference to some of the authorities quoted will reveal a keen critical sense in the author and her scientific integrity. A great merit of the book is its critical accuracy.

An interesting first chapter on the history of blood culture is followed by the most important chapter in the book, the technical instruction on how to make successful cultures of bacteria from the blood of human beings. Miss

Butler speaks with authority, since it was she who, with Dr. W. J. Fenfold, made one of the few important contributions to the literature on the subject in this country and first popularized the use of trypsinized media here. All practitioners of the subject no doubt were able to report an agreeable increase in the efficiency of their blood culture technique as a result of this published work. There can now be no doubt that the media of Hartley and Wright, to mention only two of a good lot, do enhance the value of hospital bacteriological work. The whole of this second chapter is a contribution to bacteriological literature of more than ordinary value. It is followed in order by the application of the technique to the following diseases: enteric infections and bacterial food poisoning, infections due to *Bacillus coli* and similar bacteria, undulant fever and tularæmia, puerperal sepsis, endocarditis, pneumonia, gonorrhœa and its complications, meningococcal infections, sundry infections due to *Streptococcus haemolyticus*, staphylococcal infections, infections due to anaerobic bacilli, plague, tuberculosis, rheumatic fever, rheumatoid arthritis, bacteræmia resulting from operations on infected tissues, miscellaneous diseases, such as appendicitis, diphtheria, typhus *et cetera*.

There are surely few bacteriologists who will not admit that this book will enlarge the scope of their knowledge and practical work. In any case, since this is probably the only complete book on the subject in the English language, all bacteriologists are bound to have a copy; indeed few clinicians should be without it, since the responsibility of diagnosis is always finally theirs.

There is only one criticism to offer. The book badly needs a good table setting out the number of cultures taken by Miss Butler (or in her department) and the percentage of successes over the whole series, another showing the percentage of successes in the various disease groups, and a third showing the comparative experience in the same or comparable hospital before she took on this work and put it on such a sound foundation. This material could with advantage be published as a paper later on. With this appendage we would enjoy and welcome all the more a scholarly, solid, accurate and altogether admirable book. With a good sober binding, very good paper and clear bold type the publishers have turned out a first-class volume, handy to hold and very easy to read.

#### WEIGHT REDUCTION, DIET AND DISHES.

"WEIGHT REDUCTION, DIET AND DISHES", by E. E. Claxton and Lucy Burdekin, helps to swell the number of works on these subjects.<sup>2</sup> Dr. Claxton has written for the lay public. He introduces very little scientific nomenclature, in fact only enough to enable the reader to understand the relationship between the intake of food and its energy or calorific value.

He explains the meaning of the heat unit or calorie in a very striking way. Few of us realize that one calorie represents the work done in raising 200 pounds to a height of 15 feet; thus one ounce of bread and a quarter of an ounce of butter when consumed yield enough energy for a man weighing 200 pounds to climb up 1,980 feet, more than five times the height of Saint Paul's Cathedral. The author describes several methods of dieting in order to reduce weight, and rightly points out the dangers of too rigorous a régime; he also describes the results of vitamin deficiency.

The importance of carrying out the diet consistently is the basis of success; hence many recipes of suitable dishes form the main bulk of the book. The recipes have been prepared by Lucy Burdekin, and give evidence of much knowledge and thought. The dishes are arranged according to caloric value, and are attractive and appetizing; full instructions for their proper preparation are given. The recipes alone make this book worth while.

<sup>1</sup> "Monographs of the Baker Institute of Medical Research. No. III: Blood Cultures and their Significance", by H. M. Butler, B.Sc.; 1937. London: J. and A. Churchill Limited. Demy 8vo, pp. 241, with illustrations. Price: 15s. net.

<sup>2</sup> "Weight Reduction, Diet and Dishes", by E. E. Claxton, M.B., B.S., D.T.M. & H., with recipes by L. Burdekin; 1937. London: William Heinemann (Medical Books) Limited. Demy 8vo, pp. 202. Price: 8s. 6d. net.

## The Medical Journal of Australia

SATURDAY, AUGUST 7, 1937.

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### THE MENTAL HOSPITALS IN NEW SOUTH WALES.

ON more than one occasion during the last few years we have found it necessary to comment on the failure of the Government of New South Wales to make adequate provision for the housing of persons who are certified as insane and are admitted to mental hospitals. We have yet to learn from the report of the Inspector-General for the Insane that the urgent needs of these unfortunate people have been met. Additional buildings have been erected in some institutions, but a great deal remains to be done before the Government can be said to be doing its obvious duty. In these circumstances most reasonable people would assume that any Government money that might be available would not be squandered, but would be used to further the work of the department and to promote the welfare and happiness of its patients.

The public of New South Wales has had brought before it in the flaring front page headlines of a Sunday newspaper the account of an alleged serious occurrence in one of the mental hospitals. A robbery recently took place at this hospital, when a few

pounds' worth of goods were taken from the store. The robbery was, of course, reported to the police authorities, who are conducting the usual inquiries and who may be trusted to do their utmost to bring the culprit or culprits to book. To bolster up its unwarranted attack on the Mental Hospitals Department the newspaper in question printed a large picture of a "skeleton key" which had by some means come into its possession. The whole occurrence was described in such a way as to lead the public to suppose that "skeleton keys" might pass into the possession of unauthorized persons and be used for the purpose of releasing patients. The average man or woman naturally dreads the idea of a "lunatic at large"; and those who have relatives in the wards of mental hospitals will be anything but happy in the thought that their dear ones may be able to leave the care of those to whom their welfare has been entrusted. The publication of this newspaper article is to be regretted from every point of view, but chiefly because it is an example of scaremongering of the worst possible type. It would be well if the public was informed that the mental hospitals are doing useful work in the treatment of persons afflicted with mental disease, and that something like 40% of newly admitted patients are discharged from hospital either relieved or cured. The Minister for Health of New South Wales has made a reassuring statement to the Press. He said that no unauthorized person in possession of a key such as that under discussion could open the doors of hospital wards without being seen by those in authority. It would therefore be impossible for such a person to release patients. The Minister pointed out, however, that anyone with such a key could steal from the stores branch of a hospital. Although there are, according to the Minister, only two master keys in a hospital, one in the care of the medical superintendent and the other in the care of the manager, there are many secondary keys which can be used in certain sections of the institution. With but little imagination it will be realized that a disgruntled employee or one who had been subjected to disciplinary action would have no difficulty in purloining a key which might eventually reach a newspaper office.

This story of an article in a newspaper with a picture of a key is merely a storm in a tea cup and would merit no serious attention were it not for the announcement in the daily papers that the Minister has determined to recommend to Cabinet that a commission of inquiry shall be held into the lay administration of the hospital in question. (Why the medical administration is not to receive the Minister's kind attention is not clear.) This inquiry will cost money, and money, as we have already shown, is urgently needed for many purposes in the Mental Hospitals Department; it should not be squandered in order to obtain information which can readily be obtained with practically no expenditure. A dignified statement from the Minister will be accepted by the public; his panic over a newspaper story and the picture of a key will not increase its confidence in a department which must be trusted if it is to be useful.

### Current Comment.

#### DIETARY DEFICIENCY AND MACROCYTIC ANÆMIA.

THE importance of dietary deficiencies in causing a microcytic anæmia is well known, or rather, more broadly, an anæmia of the iron-deficiency type. But the large-celled or macrocytic type of anæmia may also be due to some deficiency in the diet, as the work of Wills, Balfour and others in India shows. It is not so generally recognized that such a condition may also occur in temperate zones, though J. Groen and I. Snapper, of Amsterdam, in reporting two cases, point out that a few case reports have been already published.<sup>1</sup> The cases are those of a young woman aged thirty-three and a girl aged fourteen; the recognition of a macrocytic anæmia in young subjects makes this report both interesting and significant. The former patient had previously been living in the woods of Venezuela, where the dietary was very restricted, chiefly consisting of canned vegetables and milk, rice and bread, without any meat or eggs, and only an occasional orange or banana. Examination showed the criteria of pernicious anæmia to be present, though the gastric juice did contain a very small amount of hydrochloric acid, but only after injection of histamine. The total red cell count was less than one and a half millions. Transfusions, a mixed diet, hydrochloric acid and liver by mouth and by injection were ordered and the patient made

an excellent recovery. It was then found that the test meal showed quite a high degree of free acidity, and although the patient ceased to take liver or any form of liver extract after her discharge from hospital, she remained well. A recent blood examination, made six years after the original illness, revealed a perfectly normal picture. The second case was of similar type, and here also the test meal revealed no free acid until after the injection of histamine. It should be stated that a Price-Jones curve in each case revealed a macrocytosis of a degree consistent with an anæmia of the so-called pernicious type. It is of great interest to note that in each case also the red cells were of normal size after efficient treatment had been carried out. In the latter case also there was a history of gross dietary deficiency due to poverty, the girl's diet consisting chiefly of bread, oleomargarine and brown sugar, with potatoes and other vegetables two or three times a week. It is perhaps only just also to record that her family were vegetarian on principle, but their poor financial circumstances prevented them from buying the food they desired to eat. The child had learned to dislike meat, and when later the other members of the family fell from grace and once more ate meat, this girl remained on her previous unsatisfactory ration.

The authors point out that in each case over a long period of time there was a history of a very defective diet, lacking meat, fresh milk and eggs. The clinical picture closely resembled that of pernicious anæmia, the syndrome including a macrocytic anæmia with increase of bile pigments in the blood and urine, a smooth tongue, skin pigmentation and some mental changes. Groen and Snapper think that these two patients were deficient in the extrinsic haemopoietic factor, not the intrinsic, as happens in true pernicious anæmia. They emphasize also that there was no symptom suggesting the diagnosis of sprue, since the necessary sign of fatty diarrhoea was missing. It is worthy of note, however, that the fat content of the stools was somewhat raised above the normal and that the blood sugar curve was of the "flat" type.

Interest has been taken lately in groups of cases in which the blood picture has resembled pernicious anæmia, but in which hydrochloric acid has not been completely absent from the gastric secretion. One type has been labelled "achrestic anæmia", but many authorities are not willing to admit that there is such a clinical entity. Groen and Snapper draw attention to the need for considering the possibility of a lack of extrinsic factor in the diet as a cause of macrocytic anæmia, and also as a contributing cause for Addisonian pernicious anæmia. They have noticed that in some cases of this disease there is a peculiar history of the prolonged use of an unbalanced diet as a result of the preference of the individual for certain foods and an aversion to others. It may also be remembered that small amounts of intrinsic factor have actually been demonstrated in some cases of true pernicious anæmia. What is of still greater interest is the

<sup>1</sup> *The American Journal of the Medical Sciences*, May, 1927.

possibility of an influence on gastric secretion by dietary factors. Groen and Snapper refer to some suggestive experimental work on this subject and recall that Miller and Rhoads have not only demonstrated a diminution in hydrochloric acid in the gastric juices of imperfectly fed animals, but have observed also a coincident falling off in the intrinsic blood-forming factor. Lindgren reports that there is a high incidence of achlorhydria among certain groups of the population of Sweden whose diet consists of cereals and milk.

Many interesting avenues are opened up by the consideration of such cases as these, but for the present the greatest emphasis should be laid on the fact that diet can have a very far-reaching influence on blood formation.

#### STUDIES IN BLOOD CHOLESTEROL.

THE biochemistry of cholesterol becomes of ever-increasing importance in the human economy, and a vast amount of research is being devoted to that subject. F. Feraru and F. M. Offenkrantz have studied serum cholesterol in syphilis.<sup>1</sup> E. Henes, junior, had pointed out that, since cholesterol was employed to reinforce the antigen in the Wassermann reaction, it would not be scientific to accept as equivalent the same degree of positive serological findings in two blood specimens containing different quantities of cholesterol. Feraru and Offenkrantz endeavoured to ascertain whether or not such reasoning could lead to a better interpretation of "false positives" in complement fixation tests in non-syphilitic patients, and therefore provide a more certain method for serological diagnosis of latent syphilis. It was first essential to ascertain to what degree syphilis changes normal blood cholesterol values. The literature on the subject is conflicting. Some observers have reported a reduction of cholesterol esters in all cases. A. R. McFarland stated that the total cholesterol was medium or low rather than high. He concluded that a positive complement fixation reaction did not depend on high blood cholesterol. R. S. Weiss and A. L. Essermann found that the blood values were abnormally high. I. Rosen and F. Krasnow divided their data into six groups—the three clinical stages of the disease in treated and untreated patients. The average cholesterolæmia of all treated subjects was found to be normal, but there was a slight drop in the values in both primary and secondary untreated cases. Rosen, Krasnow and M. A. Lyons investigated cholesterol partition. They found hypercholesterolæmia in patients with neurosyphilis, and low values in primary and secondary cases. They demonstrated an increase in the percentage of free cholesterol in syphilitic subjects, and asserted that if such a relation was eventually found to obtain regularly, then perhaps the free

cholesterol of the blood influenced fixation in the Wassermann reaction.

Feraru and Offenkrantz made determinations of total and free cholesterol in the serum of 119 patients. The figures for free and total cholesterol in primary and secondary syphilis were low, especially when lesions were present at the time of examination. In the tertiary stage the figures were rather high. It was noted that on an average the total serum cholesterol began with a very low value in the early florid stages and then rose gradually with the progress of the disease, until in the tertiary stage the mean value was higher than the normal average. Feraru and Offenkrantz confirmed the findings of Rosen and Krasnow as far as the hypocholesterolæmia of early syphilis is concerned, but they do not agree that this finding applies only to untreated patients. A hypocholesterolæmia was demonstrated by E. M. Boyd in acute febrile infections, whereas hypercholesterolæmia has been found in degenerative conditions, as atherosclerosis and also diabetes and hypothyreoidism. Feraru and Offenkrantz consider that primary and secondary syphilis with skin lesions give the average cholesterol findings of an acute, though not febrile, infection. The tertiary stage would be regarded as a degenerative process. They do not intend to suggest that a disease should be regarded as infective merely because it exhibits diminished blood cholesterol. This condition has also been observed in hyperthyreoidism and peptic ulcer. The latter has been considered by some as bacterial in origin, but this has not been universally accepted. Feraru and Offenkrantz hold that hyperthyreoidism and peptic ulcer might be considered as similar in that psychogenic factors contribute to the course of each. Surely this is a strained speculation, but the writers are on sounder ground when they suggest that knowledge arising from a comparison of the cholesterol findings in syphilis with those in acute and degenerative diseases will help in elucidating the protean manifestations of syphilis. Possibly further study may show that the concept of an antibody to the treponema taking part in the Wassermann reaction will have to be abandoned.

Feraru and Offenkrantz in a further contribution give a study of serum cholesterol in patients with peptic ulcer.<sup>1</sup> They were unable to find in the literature any record of free and total cholesterol determinations in the blood serum of patients suffering from that disorder. They investigated fifty-nine patients in whom diagnosis was verified by X ray examination after a barium meal. The findings in cases of peptic ulcer, compared with those obtained in a group of normal persons, showed a definite shift to the left (lower values) of the frequency distribution curve for total cholesterol. There was a trend towards hypocholesterolæmia in this series of peptic ulcer patients and there was generally a higher percentage of free cholesterol. Although not marked, this abnormality suggests that the fall in total cholesterol is due rather to the decrease of ester-

<sup>1</sup> American Journal of Syphilis, Gonorrhœa and Venereal Diseases, May, 1937.

<sup>2</sup> The Journal of Laboratory and Clinical Medicine, May, 1937.

cholesterol than the free or uncombined. Feraru and Offenkrantz state that the exact significance of the tendency to hypocholesterolaemia in sufferers from peptic ulcer requires further investigation. They found no correlation between cholesterol concentration and the level of erythrocytes or haemoglobin. The trend to hypocholesterolaemia in the patients with peptic ulcer was significant, as most of them had been on a high fat diet for varying periods of time. This suggests that the cholesterol level did not stand in relationship to exogenous food metabolism. Cantarow and others, however, consider that, while there are no true diurnal cholesterol fluctuations, the blood levels will be higher in individuals who are on a high fat diet for long periods of time.

H. J. Rose and C. Riegel state that the desirability of a uniform method of analysis for free and combined cholesterol in both bile and blood led to a study of the applicability of the digitonide method to various ways of extraction of whole blood, serum or plasma.<sup>1</sup> They consider that this can be effected equally well by single extractions made with alcohol-ether or alcohol-acetone or by multiple extracts with ether.

These contributions to the literature of cholesterol will advance our knowledge of an intricate subject.

#### JOHN BLAND-SUTTON.

A LITTLE more than seven months ago that leading figure in British surgery, Sir John Bland-Sutton, came to the end of a long life of eighty-two years. From the pen of his friend, Sir Comyns Berkeley, there now appears an appreciation of this extraordinary man.<sup>2</sup> Sir Comyns Berkeley's dignified eulogy gives those of us who knew not Bland-Sutton a striking picture of one who, during the passage of nearly fifty years, rose to the highest pinnacle of his profession as a brilliant operator, a fine speaker and teacher, and a naturalist second only, it may well seem, to his life-long idol, John Hunter.

Like John Hunter, Sutton (for such was his name originally) was born on the farm. On his mother's side, he was of yeoman stock; and it is recorded that the mother, a capable woman, taught young John, as well as his six brothers and two sisters, to knit and sew deftly, an art which was later reflected in the famous surgeon's capacity for rapid suturing during operations. The boy's father was a small farmer or market gardener, with but little taste for cabbage-growing; he was in fact a generous, thrifless dreamer who wandered inconclusively about his farm, absorbed in the ways of birds and beasts. Sutton senior was a taxidermist of merit and a collector of specimens, so that his

cottage always housed dead birds, or lambs with two heads, extra limbs or monstrous incisor teeth. Thus was fostered John Sutton's love of natural history, and thus was developed that skill in dissection and that knowledge of comparative anatomy which was later to make him famous. The boy wandered about the countryside, gathering plants and watching the life of the fields.

From books on popular education, Sutton acquired some elementary learning. He read and reread his Bible and his Shakespeare to such purpose that both books remained his companions to the end of his life and formed the basis of his clear literary style. As many medical students do, he plunged headlong into the writings of Darwin and Huxley; he studied astronomical text-books and picked out the planets and stars. Almost until the end of his life he would rise at night to search the sky with a telescope given him by house surgeons and pupils when he retired, as senior surgeon, from the staff of the Middlesex Hospital.

Young John Sutton was ambitious, and he decided to enter the medical profession, because he knew that in it his knowledge of natural history could be used to advantage. He had barely money enough to allow for his wants during his period of medical study; but as a recompense for dissecting "parts" for purposes of demonstration he was granted free attendance at the anatomical lectures of one Thomas Cooke, a surgeon from the Westminster Hospital, who had set up a private anatomy school. In 1878 John Sutton presented himself to the dean of the Middlesex Hospital and, to the astonishment of that dignitary, set down a bag containing one hundred sovereigns, the fee required to make him a perpetual student at the hospital which he was to serve with honour for forty-two years. Appointed a prosector, Sutton thus began seventeen years of anatomical work, ending with a lectureship in that subject and an unchallenged reputation as a brilliant anatomist. So began a term of labour such as few students know today. Sutton slept for five hours each day and worked for nineteen; to save fares he walked everywhere, though he was lame of one foot. He lunched daily on biscuits and cold water. He could afford no newspapers, but was satisfied to read and glean his knowledge of current events from posters. A fortunate friendship with the president of the Zoological Gardens gave Sutton the opportunity to perform autopsies on dead animals and to increase his knowledge of the Zoo's inhabitants; in this place he successfully removed a dew-claw from a lion's foot and not without peril to himself, opened with a sickle an abscess in the jaw of a hippopotamus. Like John Hunter, Sutton disliked the set lecture, in his capacity of either auditor or speaker; but his clinical work was brilliant and he easily won such scholarships and prizes as were available. One such reward was the Murray Gold Medal for Surgery. Needing ready money, Sutton tried to pawn the trophy; but a seasoned pawnbroker broke it in halves, for it was filled with lead.

<sup>1</sup> *The Journal of Laboratory and Clinical Medicine*, May, 1937.

<sup>2</sup> "The Seven Stages of John Bland-Sutton, and an Epilogue", by Sir Comyns Berkeley. Issued as a Supplement to *The Journal of Obstetrics and Gynaecology of the British Empire*, April, 1937.

Having qualified in the year 1882, Sutton found himself unable to accept the unpaid post of a resident medical officer. He was forced to take resident pupils, whom he coached nightly. Two years later he became curator of the museum of the Middlesex Hospital, and in the same year was granted the Fellowship of the Royal College of Surgeons. This distinction led to the offer of several important posts, but Sutton rejected them all to become assistant surgeon at his old hospital and the first of its students to be elected to the honorary staff. The young surgeon's interest in comparative anatomy was still unabated; to his house in Gordon Street there came an unending procession of dead animals, which were deposited in a small back garden. The local atmosphere was soon filled with highly important smells. The arrival during very hot weather of two deceased sharks had little effect in promoting neighbourly feelings in Gordon Street. In 1886 Sutton married and the bride occupied the honeymoon in the rearrangement of the drawing-room as a museum of comparative anatomy.

During his zoological researches Sutton had become interested in the dental tumours of animals, a study which he continued later in human beings. His grouping of odontomes forms the basis of the classification of today, and as the result of many papers contributed to dental journals, he became known as the "dentist's surgeon". But his profound knowledge of comparative pathology and anatomy had more important results still: Sutton's dissections of the pelvic organs of female animals led him logically to the study of analogous viscera in the human female, and in the end convinced him that tumours of the uterus could be removed by hysterectomy. The statement aroused the hostility of his colleagues; Sutton was told that such a surgical procedure amounted to murder, and that a supply of fresh air, fresh eggs and fresh butter offered a woman suffering from uterine fibroids her best chance of recovery. Nevertheless, unperturbed by criticism, Sutton introduced the successful practice of hysterectomy. This was his great contribution to abdomino-pelvic surgery, and an operation which brought him fame and fortune, just as the operation of ovariotomy brought both to Spencer Wells.

In 1899 Sutton changed his name by deed-poll to that of Bland-Sutton, the added prefix being the surname of his maternal grandfather. The surgeon now devoted his practice almost entirely to abdomino-pelvic surgery, perfecting his methods of performing hysterectomy and stabilizing the technique of many pelvic operations. Bland-Sutton was now recognized as the chief gynaecological surgeon of his time. Distinctions showered upon him—the councillorship of the Royal College of Surgeons in 1910, a knighthood in 1912, the degree of LL.D. (Aberdeen) in 1914. In 1916 Bland-Sutton was appointed Hunterian Professor and became Vice-President of the College of Surgeons two years later.

The famous surgeon was a man of many interests and his friends included many people of note in the

professions and the arts. For twenty-eight years he entertained lavishly at his Brook Street house, where he erected, at huge expense, a replica of the Hall of Honour built by Darius the Great at Susa in 486 B.C. The beautiful hall was later demolished to make way for additions to Claridge's Hotel.

Bland-Sutton's published addresses and scientific papers reach a total of some 380, and books written by him number eleven. He regarded one man only as a hero—John Hunter. In truth the two were spiritual brothers. Both were the sons of farmers, both loved all forms of animal life, both were ceaseless workers, both had unequalled knowledge of comparative anatomy. We think inevitably of Bland-Sutton when we read Hunter's letters to Jenner; we are reminded forcibly of Hunter when we read of Bland-Sutton's back-garden dissections of sharks. Their common attribute was that quality indispensable to the scientist: a burning, ceaseless curiosity which recalls an eager terrier sniffing tremendously at a rat-hole.

#### PRURITUS ANI.

THE condition known as *pruritus ani* is not properly understood. Two types are described; by some these are called the direct and indirect, by others the essential and idiopathic forms. In the so-called direct or essential variety diseases of the anus, such as fistulæ, fissures, ulceration, polypi, papillæ and haemorrhoids, have been held responsible. The indirect or idiopathic form occurs without an obvious cause and has been attributed to a disease in distant organs, the local itching occurring as a reflex phenomenon. C. C. Tucker and C. A. Hellwig have made a clinical and histological study of 43 cases.<sup>1</sup> Though some of their conclusions have been reached by other writers and though they offer no therapeutic suggestions, their paper is well worthy of the attention of those who have access to it. Their 43 cases occurred among 386 patients suffering from conditions of the rectum. They found on histological study that the pathological picture of the anal canal of a patient with pruritus was not different from that of the anal canal of a patient without pruritus. They conclude that anal lesions are not the essential cause of pruritus. This agrees with the authors' clinical experience that radical removal of anal lesions will often ameliorate the patient's condition, but will seldom effect a cure. The histological picture was not in agreement with the view that bacterial or fungal infection is the cause of pruritus; they also excluded allergy and neurogenic factors. They conclude that *pruritus ani* is a chemical dermatitis; and they point out that human faeces contain substances known to produce the cutaneous changes observed by them in pruritus. *Pruritus ani* runs a typical course, and these authors describe four stages of cutaneous change.

<sup>1</sup> Archives of Surgery, May, 1937.

## Abstracts from Current Medical Literature.

### MEDICINE.

#### Artificial Pleural Effusions.

GUSTAV MAURER (*The British Journal of Tuberculosis*, April, 1937) describes types of collapse treatment in which an artificial pleural effusion, by producing a symphysis between parietal and visceral pleura, may be beneficial. He points out that it is being forgotten how frequently tuberculous disease is confined to one lobe. Unfortunately, it is often found in both upper lobes. But bilateral collapse therapy meets with very little success, mainly because collapse cannot be made effective without actual oxygen deficiency. The author insists that bilateral pneumothorax can be made much more effective and safer if the sound areas of the lung are fixed to the chest wall in such a way that only the diseased areas are made to collapse. To obtain this, he first obtains a selective pneumothorax, whereby healthy lung is in contact with the chest wall, while the diseased upper lobe remains retracted. At this stage the artificial effusion is produced; after absorption of the effusion the pleural cavity is obliterated over the healthy parts of the lung. He then maintains a "lobar pneumothorax" over the diseased area. His technique is to inject a 50% solution of glucose into the pleural cavity, usually fifty cubic centimetres. Constant fluoroscopic control is necessary. The author has so far observed no complications. He has hitherto limited the method to patients who would not have recovered, in his opinion, without "lobar fixation"; but he thinks that the indications can be extended. He sounds a warning, however, that long and careful clinical and radiological observation is necessary and that the method is not suitable for ambulant patients.

#### Development of Tuberculosis in Adult Life.

J. ARTHUR MYERS *et alii* (*Archives of Internal Medicine*, January, 1937) point out that the world-wide campaign against tuberculosis has so greatly reduced or controlled the number of cases of communicable tuberculosis in both man and animals that large numbers of children grow to adult life without having had the first infection type of tuberculosis. A proof of this view lies in the fact that there are an increasing number of persons who fail to react to the tuberculin test. Fears have been expressed that as children have not received their so-called protective doses of tubercle bacilli, very serious forms of the disease will occur when these individuals are exposed to infec-

tion in later life. The study here reported has been undertaken to determine the effects of exposure to the tubercle bacillus on individuals hitherto free from such infection. A group of some 12,000 students and nurses provided the clinical material, and on admission to their particular school of training they were tested by tuberculin and their subsequent history was closely followed. The tuberculous patients have been grouped for convenience of description; in the first group of two cases the reaction to tuberculin changed from "negative" to positive under observation and *erythema nodosum* appeared. *Erythema nodosum* is not regarded as a clinical form of tuberculosis. In the subjects of the second group the reaction to tuberculin changed from "negative" to positive and a primary focus was demonstrated by radiological examination. No other lesions were demonstrated; twenty-one cases are reported in this group. Eighteen persons in the third group showed the change in the tuberculin reaction; in some instances the primary parenchymal changes were demonstrable radiographically and not in others; pleural effusion also developed. This condition is regarded as a reinfection form of tuberculosis which develops from the focus of the first infection. In the fourth group of twenty-five cases, in addition to the change in the tuberculin reaction, clinical pulmonary lesions made their appearance, with or without a demonstrable primary focus or pleurisy with effusion. The fifth group is composed of those who were positive reactors to tuberculin when the observation began, but in whom there was no evidence of clinical disease. Later, reinfection forms of tuberculosis made their appearance. Some fifteen case histories are given of such instances. The sixth group comprises those who were not tested by tuberculin and who had normal radiological findings, but later developed extensive pulmonary tuberculosis; only four cases are included here. The conclusions to be drawn from the investigation are as follows. A positive reaction to tuberculin in a person who has previously shown no reaction to the test is the first obtainable evidence of tubercle formation in the body, and there are no external manifestations of the disease at the time the result of the skin test first becomes positive. The first infection type of tuberculosis as observed in this group has resulted in no significant symptoms or abnormal physical signs throughout the entire course of development. It makes little or no difference at what time of life the first infection with tubercle bacilli occurs as far as the evolution of tuberculosis in the human body is concerned. When the first infection occurs in the second or third decade of life the lesion is just as benign as when it occurs in childhood. During the period of observation the authors have seen the complete evolution of

tuberculosis and have observed practically every step in its development from the time before the tissues became sensitized to tuberculin until death occurred from consumption. There is usually a period of many months or even years between the development of the first infection type and the appearance of the reinfection type of the disease. In those subjects who became sensitized to tuberculin while they were under observation and in whom clinical pulmonary tuberculosis later developed, there was not observed to be any difference in the intensity of the disease or in the response to treatment from that in a group of young adults in whom reinfection forms of tuberculosis had developed, but who were known to have been infected in infancy or childhood.

#### Addison's Disease.

E. M. KLIVE (*The Journal of the American Medical Association*, May 8, 1937) has recorded a case of Addison's disease in which salt restriction caused an early relapse. It is known that reduction of the intake of sodium chloride from an average 12 grammes to 1 to 4 grammes daily leads to typical Addisonian crisis usually between the third and fifth day. At the same time sodium and chloride are lowered and potassium and nitrogen are increased in the blood. In the author's case, when the sodium chloride intake was reduced from 12 grammes to less than 4 grammes per day, there was complaint of weakness, the blood non-protein nitrogen increased from 32 to 48 milligrammes per 100 cubic centimetres, plasma chloride fell from 326 to 284 milligrammes per 100 cubic centimetres, and plasma sodium to 223 milligrammes per 100 cubic centimetres. Prompt recovery followed the intravenous injection of 3,000 cubic centimetres of physiological sodium chloride solution. In Addison's disease, improvement following injection of cortical adrenal extract is not sufficient to establish the diagnosis. In the author's case injections of sterile water were given in place of cortical extract, with definite improvement in the patient's condition. This type of patient is said to respond well to psychotherapy and suggestion, and the author is doubtful whether improvement reported was due to suggestion or to the therapy. In true Addison's disease, if cortical extract is used, it should be given frequently and in large doses, but its use should be reserved for obvious cases of Addison's disease.

#### Pneumonia.

R. L. CECIL (*The Journal of the American Medical Association*, February 27, 1937) discusses the effects of very early serum treatment in pneumococcus Type I pneumonia. It is well known that serum treatment in

any condition must be used at an early stage if it is to be effective. An analysis of results in the treatment of patients within the first twenty-four hours of illness showed that in many a complete abortion of the disease was produced. When given later, serum often caused the lesion to be confined to one lobe of one lung. Daily X ray examination of the lungs showed that the area of infection was sharply demarcated and rapidly faded out after early serum treatment. Bacteriæmia which developed early was promptly eliminated by serum therapy. The leucocytes diminished and the immature white cells decreased in numbers, with an increase of monocytes soon after early injection of serum. The authors collected records of 160 cases of Type I pneumonia in which concentrated Type I serum was given during the first twenty-four hours. The average dose of serum was 181,000 units; the average duration of fever in patients who recovered was 47 days. In those cases in which serum was not given the fever usually lasted seven days on the average. No case of empyema occurred, whereas about 6% usually occur in Type I pneumonia. There were only two deaths in thirty-seven cases, 5.4%; both the patients who died were alcoholics, and one received only 50,000 units of serum, insufficient in a serious infection. Type III pneumonia presents difficulties, but pneumonia due to Types II, V, VII, VIII and XIV is amenable to serum treatment as well as Type I. The author suggests that 65% of pneumococcal pneumonia can be treated with serum, and recommends more widespread typing of the organism.

#### Chronic Ulcerative Colitis.

R. O. GARVIN AND J. A. BARGEN (*The American Journal of the Medical Sciences*, June, 1937) have investigated the haematological picture in chronic ulcerative colitis with a view to determining its usefulness, if any, in prognosis and treatment. In the records of 125 cases a lowering of the hemoglobin value was observed, the values ranging from 1.8 to 16.7 grammes per 100 cubic centimetres of whole blood with an average of 11.1 grammes. The erythrocytes were also lower in number, the average colour index being 0.77. The number of reticulocytes was within normal limits, as also were the gastric acidity and bleeding and coagulation times. There was no involvement of the nervous system. There was no definite relationship between the haemoglobin value, the number of erythrocytes and the duration of the disease nor the anatomical extent of the lesions. The factors contributing to the development of the anaemia in this disease are chronic hemorrhage, limitation of iron-containing foods, rapid transmission of food through the colon and chronic sepsis. The leucocyte count ranged

from 5,000 to 10,000 per cubic millimetre. In every instance in which there was a persistently higher count than 10,000 cells there was a complication of varying severity. A leucopenia may develop in particularly virulent phases of the condition, and was found to be associated with a fall in the erythrocyte count. A study of the neutrophile cells was of particular interest; the granules were considerably larger and stained more deeply, a large number of vacuoles were present, there was a very high percentage of non-filamented cells. All of these features in the neutrophile cells indicate a shift to the left and a very toxic process. The filament-non-filament count runs almost a parallel course with the clinical condition. The sedimentation rate is also a useful criterion of the pathological state, but it is influenced more by extraneous factors than the filament count, and is therefore of less real value. The average duration of the disease in cases with a normal haemoglobin and erythrocyte count was 1.3 years; in those cases with subnormal readings the condition lasted three years. When an attempt is made to establish the relationship between the value for the haemoglobin and the duration of treatment, the methods of increasing the amount of haemoglobin come up for review. The standard treatment is the administration of iron in some suitable form and dosage. Many patients cannot tolerate an adequate dose of any form; those that can do so show a definite and prompt amelioration in the local symptoms as well as in the general state. Small transfusions of blood in quantities of 200 to 250 cubic centimetres are useful and, if repeated till the blood constituents are normal, lead to an improvement in general well-being as well as to a secondary lessening of the intestinal disturbance. Administration of iron at this stage is not only possible, but useful in keeping up the haemoglobin value.

#### Chronic Gastritis.

By the use of gastroscopy in some 2,500 patients, all of whom had abdominal complaints, Rudolph Schindler *et alii* (*The Journal of the American Medical Association*, February 6, 1937) have rediscovered clinical chronic gastritis. It is pointed out that this method of examination is easily carried out in healthy persons of all ages, and information is obtained in regard to the condition of the gastric mucosa which previously was unobtainable; it is impossible to secure specimens of normal healthy stomachs, as *post mortem* changes alter the picture and normal stomachs are not resected. Of the series, 23% had normal stomachs as judged by the gastroscopic appearance of stomachs of normal persons. Mucosal changes similar to chronic inflammatory changes in other mucous membranes, such features as layers of

whitish, greyish or greenish mucus or hyperæmic spots were seen in 50% of the subjects. This condition usually heals and has been termed "superficial gastritis". Microscopically there is cloudy swelling of the cells and slight interstitial infiltration. Some of these persons, however, later presented a different picture: thin greenish-grey spots which remained permanent. "Atrophic gastritis" had developed; total atrophy of the mucosa has been observed, and it appears as a thin greenish-grey membrane, through which the blood vessels protrude. A primary atrophic gastritis also occurs, as in pernicious anaemia. Another picture is that of "hypertrophic gastritis". Gastroscopically, a swollen and thickened, velvety mucous membrane is seen, often containing haemorrhages and erosions as well as nodules or large nodes and creases. The course of hypertrophic gastritis is typified by failure to revert to the normal picture and sudden recurrence of symptoms, even while careful management is being carried out. Some persons have been observed over many years, and gastroscopy has been carried out as often as sixty-five times on one patient. No atrophy develops. In most instances symptoms have been present for an average of five years or more. Hypertrophic gastritis predominated in the male, and the age period was twenty to sixty years. Appetite was often poor; the discomfort and distress were usually epigastric, the site of the lesion playing no part in its time of onset; but it occurred earlier in the atrophic type than in the superficial and hypertrophic forms. There was some periodicity in the symptoms, but this was not so pronounced as in the presence of ulcer. Alkali gave relief in about half the superficial and hypertrophic forms; food made little difference. Flatulence was a frequent symptom; the intestinal function was normal in all types. Physical examination usually revealed no abnormality; gastric analysis, acidity tests, other chemical tests and the cell count of the stomach content are almost useless. Radiography is disappointing in the examination of chronic gastritis. Gastrography is of little value, the best panchromatic films not being sensitive enough for this part of the spectrum. Careful treatment is essential, as the immediate suffering of the patient is no less important than the sequelae. Bland diet in small frequent feedings is indicated. In the superficial type, rest in bed for eight days with hot applications, and regular gastric lavages should be carried out if there is abundant mucus or muco-purulent secretion. In hypertrophic gastritis lifelong adherence to a strict diet is necessary. If erosions are present, they may be irrigated with weak silver solution. Milk must be avoided in the atrophic form, hydrochloric acid relieving the sensation of pressure and the disagreeable taste. Parenteral liver therapy may be tried in all atrophic forms.

## Public Health.

### AUSTRALIAN CANCER CONFERENCE.

THE eighth Australian Cancer Conference was held at the Institute of Anatomy, Canberra, on April 13 to 16, 1937, Dr. J. H. L. CUMPTON, Director-General of Health, Commonwealth Department of Health, in the chair.

The conference was attended by representatives of the several State organizations for the control of cancer in Australia, and by representatives of the New Zealand Branch of the British Empire Cancer Campaign Society. Representatives were also sent from the Universities of Melbourne and Sydney; from the New South Wales, Victorian, Queensland, Western Australian and Tasmanian Branches of the British Medical Association; from the Royal Australasian College of Surgeons and the Australian and New Zealand Association of Radiology; and from research institutions and hospitals in which properly equipped centres are established for the treatment of cancer. THE MEDICAL JOURNAL OF AUSTRALIA was represented by Dr. F. P. Sandes.

#### Opening Proceedings.

The conference was to have been opened by the Right Honourable W. M. Hughes, Commonwealth Minister for Health. Mr. Hughes, however, was unable to be present owing to illness. He sent an address which was read to the members of the conference by the Chairman. In this address he referred to several questions that he had raised in his address of the previous year. The Commonwealth Government had taken action on the recommendation of the seventh Cancer Conference and had established an Australian Research Council. It was satisfactory that in the two States in which no anti-cancer organization had existed at the time of the last meeting, an effective organization had since come into being. In every State an efficient and enthusiastic organization was at work. Mr. Hughes then referred to the importance of providing for patients living in the country the facilities of treatment enjoyed by metropolitan residents. He paid a tribute to the work that had been done in this regard for several years by the Queensland Cancer Trust. He also referred to the work of the Commonwealth Radium Laboratory in Melbourne. In conclusion, Mr. Hughes said that it was his intense desire that no machinery needed in the campaign against cancer should be lacking.

On the motion of Professor D. A. Welsh, seconded by Captain E. R. B. Pike, the members of the conference sent to Mr. Hughes a telegram thanking him for his address and expressing their disappointment at his inability to be present and their good wishes for his speedy recovery.

After the Chairman had welcomed the delegates to the conference he explained that at the previous conference a great deal of time had been devoted to clinical matters. In the present instance a considerable proportion of the time would be devoted to the presentation of papers and reports on radiological physics, biophysics, biochemistry and pathology.

#### Reports on Developments in Cancer Control in Australia during 1936.

Dr. M. J. Holmes reviewed the developments in connexion with cancer control in Australia during 1936. He summarized the principal developments as follows:

1. The establishment of a State organization for the control of cancer in Victoria—the Victorian Anti-Cancer Council. The organization, which was very complete, had been placed on a firm and enduring basis as a statutory body, the council being incorporated by Act of Parliament. An authoritative organization had been formed in each State of the Commonwealth to handle cancer control measures within the State.

2. The establishment by the Commonwealth Government in September, 1936, of the National Health and Medical Research Council in accordance with the recommendation of the last Cancer Conference. This council had held its first meeting in February, 1937.

3. The development or extension of efficient local physical services in the several States in relation to radiation therapy, and the full cooperation of these services with each other and with the Commonwealth X-Ray and Radium Laboratory in the University of Melbourne. As a result of the constant stimulation of the annual Cancer Conference, the establishment of these physical services had been facilitated and rapid development had taken place. This had enabled both radium and X ray therapy to be employed with the high standard of scientific accuracy which had so greatly improved the results achieved.

4. Progress in the development of extra-metropolitan centres for examination, diagnosis and treatment of cancer, as recommended by the last conference.

5. Finalization of arrangements for setting up a radon plant at the University of Queensland. With the establishment of this depot each State except Tasmania was provided with a radon depot and service. In Tasmania arrangements had been made for regular supplies of radon to be provided from the Commonwealth Radium Laboratory in Melbourne, and air transport arrangements permitted of the radon reaching Launceston or Hobart within three or four hours after leaving the laboratory in Melbourne. The establishment of a separate radon plant for Tasmania was therefore not necessary.

6. The reconditioning of radium and the adjustment of hospital supplies, thus promoting efficiency and economy in the employment of the available radium.

7. Progress in the installation of deep therapy X ray plants in additional hospitals, and in the replacement with modern installations of the old plant in other hospitals.

#### Action Taken in Regard to Resolutions of the Seventh Australian Cancer Conference.

Dr. Holmes reported on the action which had been taken in regard to the resolutions adopted by the seventh Australian Cancer Conference held in Melbourne last year. He pointed out that in respect of the great majority effective action had been taken. He said that a special report would be submitted by the committee appointed to consider the adequate provision and arrangements for examination, diagnosis and treatment of patients living in areas outside the metropolitan areas. Action had also been taken by the Commonwealth Department of Health with a view to extending the facilities available in suitable extra-metropolitan centres.

At Bendigo, in Victoria, the local hospital had for some years held a small supply of Commonwealth radium, but this was not employed very efficiently nor were records of clinical history and of treatment and of its results kept. Following consultation between a representative of the Commonwealth Department of Health and representatives of the Bendigo and Northern Districts Base Hospital Board and of the local subdivision of the British Medical Association, a consultative clinic was established at the Bendigo Hospital to examine and consult upon all patients with cancer admitted as out-patients or in-patients to the hospital, with a view to selecting treatment and applying it, and recording and following up the patients after treatment. The Medical Officer in Charge of the Commonwealth Health Laboratory at Bendigo had been appointed a member of this consultative clinic, and arrangements had been made for free pathological examinations at the Commonwealth Health Laboratory. X ray examinations were also provided for at this laboratory. The supply of Commonwealth radium issued on loan to the hospital had been increased, and arrangements had been made for radon supplies to be available at request in order to supplement the radium.

Close association had been established between the consultative clinic and the Commonwealth X-Ray and Radium Laboratory in Melbourne and with the radiotherapeutic departments of hospitals in Melbourne. Four of the

members of the consultative clinic had visited Melbourne on a number of occasions in order to attend the radiotherapeutic clinics there and the Commonwealth X-Ray and Radium Laboratory, and in this way had become conversant with details of the latest techniques of treatment and with the physical services available. The clinic had proved very successful, and it was hoped that later it would be available to general practitioners in northern Victoria for consultation and advice upon their cases, even though the patients might not be referred to or admitted to the hospital by the private practitioners concerned.

At Newcastle, in New South Wales, similar consultation had been arranged between the Commonwealth Department of Health and the hospital staff, and the first steps had been taken to set up a similar consultative clinic at that hospital.

In one or two other instances in which a similar attempt had been made by the Commonwealth Department of Health to initiate extra-metropolitan clinics it had been considered locally, for reasons given in the report of the subcommittee, that such action was not advisable, and no clinic had been formed.

#### **Facilities for Early Diagnosis and Treatment in the Country.**

At the seventh conference Dr. F. S. Hone and Sir Henry Newland had been appointed a subcommittee with power to coopt members from each State for the purpose of inquiring into the possibility of improving the facilities for early diagnosis and treatment of cancer in patients living in the country. It was explained that Sir Henry Newland and Dr. Hone had agreed that the most practical way of carrying out the conference resolution was to form the medical members of the Adelaide Hospital Cancer Clinic into a local committee acting with the convenors, and to associate with it liaison officers in each State. Eventually this plan was adopted. The liaison officers appointed were: Dr. J. Newman Morris (Victoria), Dr. F. A. Maguire (New South Wales), Dr. L. M. McKillop and Dr. Val McDowall (Queensland), Dr. W. P. Holman and Dr. D. Parker (Tasmania), Dr. A. Syme Johnson (Western Australia).

The subcommittee presented an interim report, for it was quite impossible to cover in one year all the questions raised in the resolution of the seventh conference. In the summary of this interim report it was stated that the net result of the subcommittee's inquiries revealed the diversity of conditions and of needs in the different States, and made it evident that at present no concerted plan could be laid down or attempted; that each State organization had to tackle its own problems to the best of its ability; that advance would be slow and irregular and would depend on steady educative campaigns through the year, and the pooling at each annual Cancer Conference of information or experience gained during the year. It was evident also that the requisite essentials for an effective consultative clinic, namely, proper hospital accommodation, a sufficient staff of medical men expert on the clinical and operative side and on the pathological side, with a supply of radium and a deep X-ray plant as well as X-ray diagnostic facilities, could not be obtained until a city had reached a certain size. Even then some of the hospital staff had to be willing to bear the expense of gaining radiotherapy experience at a capital city in Australia or overseas—which was the difficulty experienced in certain places. Also the population of the surrounding districts should be sufficient to make the proposition economically justifiable. Port Pirie, for instance, had the same hospital, pathological and clinical facilities and was about the same distance from the capital as Bendigo; but investigation showed that for the past four years biopsies at the local laboratory had numbered twenty-three for the town and twelve for the surrounding districts. In these circumstances it was a more economical proposition for the present to continue to pay for patients to come to the central clinic than go to the expense of providing radium and a deep X-ray plant at Port Pirie.

After discussion it was resolved:

That the Commonwealth Government give consideration to the advisability of becoming a member of the International Union against Cancer.

That State organizations formed for the control of cancer become affiliated with the British Empire Cancer Campaign and display its badge on their publicity matter.

That more active steps be taken in regard to educational and publicity work throughout the Commonwealth.

#### **Cancer of the Skin and of the Lip.**

Dr. M. J. Holmes presented a statistical compilation of the results obtained by various methods in the treatment of 9,108 cases of cancer of the skin and 1,557 cases of cancer of the lip. This compilation was prepared by a consolidation of the information supplied from eleven large cancer treatment centres in Australia which had maintained accurate records and had followed up their patients for a series of years. The compilation indicated separately the results obtained in the treatment of each pathological type of the disease, in the several stages of the disease, and for separate years, so that 8, 7, 6, 5, 4 and 3 years' results were separately tabulated. The results obtained in the employment of some eighteen different methods of treatment were indicated. In this compilation 324 separate tables were presented, and complete sets of these tabulations were circulated to the members of the conference.

Dr. Holmes proceeded to explain the tables by reference to typical examples. The tabulations indicating the results of treatment by various methods were followed by a series of compilations indicating age and sex distribution in carcinoma of the skin and of the lip, and the distribution of mortality in age groups in males and females. Tables were shown indicating the proportion of total patients coming under treatment at the various stages of the disease, and other tables indicated the proportion of total cases tabulated in which glandular involvement had occurred in the course of the disease, and the proportion of the cases in which diagnosis had been confirmed by histological examination.

Some figures were given also indicating geographical distribution of cases and racial incidence in relation to complexion, whether blonde or brunette.

Dr. Val McDowall read a paper entitled "Skin Cancer and its Treatment" (see page 210).

Dr. C. F. de Monchaux read a paper entitled: "Interstitial Radium Treatment in Carcinoma of the Lip: A Review of Seventy-One Cases" (see page 221).

Dr. E. H. Molesworth read a paper entitled "Carcinoma of the Skin and of the Lip" (see page 218).

Dr. L. M. McKillop and Dr. S. W. Mason presented a paper in which they described the use of the Chaoul contact therapy apparatus and the results obtained in treatment by this method.

Dr. J. S. MacMahon read a paper entitled "Epithelioma of the Lip". This paper, having previously been read at a meeting of the Royal Australasian College of Surgeons, will be published in *The Australian and New Zealand Journal of Surgery*.

Dr. Clennell Fenwick read a paper dealing with the radiation treatment of cancer of the lip. In this paper he recorded the results of the treatment of cancer of the lip with buried radium needles and with irradiation of the glandular areas since 1931 as follows:

1931 (11 patients)—		
Alive and symptom-free, 1937 .. . . .	7	
Dead of intercurrent disease, but cancer-free .. . . .	4	
1932 (8 patients)—		
Alive and symptom-free .. . . .	4	
Symptom-free for three years, but not traced since .. . . .	4	
1933 (7 patients)—		
Alive and symptom-free .. . . .	5	
Dead, cancer-free .. . . .	1	
Locally symptom-free, but now has cancer of floor of mouth .. . . .	1	

1934 (12 patients)—	
Alive and symptom-free	7
Dead of intercurrent disease, cancer-free	1
Died of cancer of glands	2
Not traced	2
1935 (13 patients)—	
Alive and symptom-free	12
Dead of cancer of glands	1
1936 (13 patients)—	
Alive and symptom-free	13
Of 64 patients there were:	
Alive and symptom-free—	
After 5 years	7
After 4 years	4
After 3 years	5
After 2 years	7
After 1 year	12
Recent cases	13
	48
Dead of intercurrent disease, but cancer-free	6
Dead of cancer, glands involved	3
Locally symptom-free, but has cancer of floor of mouth	1
Symptom-free for some years, but not traced this year	6

Professor D. A. Welsh read a paper on the pathology of skin cancer, freely illustrated by lantern slides. He was followed by Dr. J. V. Dubig, who discussed the subject of radio-sensitivity and radio-resistance of tumours in relation to the selection of treatment.

These papers were followed by discussion upon the whole subject of skin and lip cancer. The question of procedure to be followed in dealing with the glandular systems within the drainage areas of skin and lip cancer was discussed. Considerable divergence of opinion was expressed, particularly in relation to the treatment of glandular areas liable to be involved in carcinoma of the lip. During this discussion attention was drawn to the large amount of time involved in collecting data and compiling statistical information for the Cancer Conference in relation to the results of treatment. The conference was asked to consider this matter and to give a decision before the conference ended as to whether the value of the information collected justified the continuance of this effort in future years.

#### Radiological Physics.

Dr. C. E. Eddy briefly introduced a review of the activities of the Commonwealth X-ray and Radium Laboratory for the year 1936. This covered not only the several activities of the laboratory itself, but also briefly reviewed the progress made in the establishment of physical services in the several States.

Dr. Eddy then presented a review of recent developments in radiological physics. This review covered developments in relation to X-ray and radium equipment and in measurements *et cetera*, and indicated possible developments in radiation therapy.

The attention of the conference was drawn to a booklet of some sixty pages dealing with physical aspects of radium and radon therapy, which had been prepared by Dr. Eddy and Mr. Oddie, of the Commonwealth X-Ray and Radium Laboratory, and published by the Commonwealth Department of Health for the guidance of medical men engaged in the use of these remedies in the practice of radiotherapy. Copies of this booklet were circulated to members of the conference.

Assistant Professor G. H. Briggs, who had recently returned from a visit to Great Britain and the United States of America, then gave a review of his observations on the application of physics in radiotherapy in those countries. He had visited a large number of institutions, and his observations covered not only developments in high voltage X-ray therapy, but also in radium and radon therapy.

Dr. William Love read a paper illustrating the effect of curvature on the distribution of radiation intensity near a radium ring.

Mr. A. F. A. Harper, the physicist appointed by the Sydney University Cancer Research Committee to the local physics service in New South Wales, discussed the filtration and the quality of beams in Röntgen ray therapy.

After discussion on these papers it was resolved, on the motion of Dr. Kaye Scott, seconded by Dr. E. H. Molesworth:

That in the opinion of this conference it is essential to continue the existence and services of the Commonwealth X-Ray and Radium Laboratory.

That in Australasia all clinical measurements of X-ray dosage delivered be expressed in *r* units, the measurements in all cases being understood to include "back-scatter" effect.

#### Australian Organization against Cancer.

The conference discussed the Australian organization for the control of cancer, and also the arrangements for holding the next Cancer Conference.

Dr. F. P. Sandes moved and Sir Hugh Devine seconded the following motion:

That, with a view to the better organization of cancer investigation in Australia, both theoretical and applied, a committee be appointed with instructions to report to the next conference upon the following subjects: (a) The recent advances in biological, chemical and physical science, and in clinical practice, which have a bearing on cancer problems. (b) The capacity and limitations of Australian research laboratories and hospitals to conduct cancer research and treatment, with special reference to equipment, personnel and finance. (c) Cancer education.

Members of the conference considered that the range covered by this motion was too wide for all aspects to be included in a report by a committee to the next conference, and it was decided that a committee should be appointed to report to the next conference on the subject of developments in biochemical research in relation to cancer problems and of biochemical science in relation to the treatment of cancer.

A subcommittee consisting of Professor D. A. Welsh, Professor H. Priestley and Dr. F. P. Sandes was appointed to nominate a committee for the purpose of putting this resolution into effect. At the termination of the conference this subcommittee had been unable to agree in nominating a committee, and the resolution in consequence did not become effective.

When the arrangements for the next (ninth) Cancer Conference were being discussed, Dr. Holmes asked the conference to consider the question of the preparation of statistical data. For the present conference a large amount of detailed statistical information had been gathered and consolidated in relation to results of treatment and in relation to other aspects of cancer of the skin and of the lip. The conference had indicated that it considered this statistical information of great practical value. But the collection of the data involved a great expenditure of time and effort, not only on the part of the Commonwealth Department of Health, which consolidated the data and analysed them, but on the part of every hospital which contributed to the compilations. Something in the nature of a protest had been received intimating that there was a feeling that too much effort was being demanded of hospitals collecting these data. Dr. Holmes pointed out that it was of little value having efficient recording and follow-up systems unless the information was collected and compiled, but it was for the conference to say whether the value of the data as presented to the conference justified the large amount of time and effort involved in their preparation and tabulation. He thought that it did, and, if the conference thought so, then it would be necessary to decide what data should be collected for the next

conference and to select the region to be covered by the compilation. He suggested that, as particularly important work had for years been going on in Sydney in the treatment of cancer of the uterus, and as there had been the closest collaboration between surgeons, radiologists and pathologists in this work in Sydney, it would be particularly appropriate to take cancer of the uterus for the principal clinical subject at the Sydney conference. If this suggestion was adopted it would be necessary to define clearly the scope of the investigation, to decide whether it would include the whole female genital tract or be restricted to the uterus itself.

The conference expressed the opinion that it was essential that the compilation of accurate data regarding the results of various methods of treatment and regarding other aspects of cancer should continue.

Dr. W. G. Cuscaden supported the proposal that cancer of the uterus be taken for the next Cancer Conference, but considered that cancer of the vagina, vulva and urethra should be included in the scope of the investigation.

Dame Constance D'Arcy moved that the subject for clinical discussion at the next Cancer Conference should be limited to cancer of the uterus, cervix and corpus. This was seconded by Dr. Clarence Read and carried.

On the motion of Dr. F. P. Sandes, seconded by Dr. Val McDowall, it was resolved:

That it be a recommendation to the Minister for Health that a delegate or delegates to represent Australia be sent to the Fifth International Radiological Congress, to be held in Chicago, United States of America, in September, 1937.

That such delegate or delegates be requested to visit also centres of cancer activity in America to collect information and report to the next Cancer Conference.

#### Biophysics and Biochemistry.

Dr. William Love, Physicist of the University of Sydney Cancer Research Committee, read a series of papers as follow: "On the Significance of the Time Factor in the Determination of the Quantitative Biological Reaction to a Given Dose of Radiation", "On the Relative Biological Effects Produced by Equal Radiation Doses from Radium and from Radon", "On Cholesterol and Cancer: A Study of the Effect of Irradiated Cholesterol on the Skins of Mice", "On Split Dosage in Radiotherapy".

Dr. G. Harker read a paper discussing in detail various factors influencing radio-sensitivity and indicating the work in this line of research which is being carried out by him at the University of Sydney.

Dr. Henry L. Brose then read a paper on investigations carried out by him under the Cancer Research Committee at the University of Sydney in regard to the use of photonic cells in micro-chemical analysis.

This was followed by several papers by Dr. H. L. Brose and Dr. Ernest Jones, relating to work carried out by them in collaboration under the Cancer Research Committee of the University of Sydney. These papers were as follow: "An Effect of X Radiation of the Blood as indicated by Measuring Changes in the Phosphorus-Partition in the Red Cells and Plasma in Vivo and in Vitro", "On a Refinement of the Fiske-Subarow Method for the Colorimetric Estimation of Phosphorus in Human Blood", "On the Significance of the Phosphorus Partition in the Blood of Cancer, Non-Cancer and Normal Patients".

#### Pathology of Cancer.

Professor D. A. Welsh read a paper on the contact spread of cancer, nascent cancer, progressive carcinogenesis *in situ* and carcinoma *in situ* in relation to modern thought.

Professor E. D'Ath presented a report in which he outlined the cancer research work that was being carried on in New Zealand.

#### Pathological Classification of Cancer and Medical Certification of Deaths from Cancer.

The previous conference had invited Professor Welsh and Professor MacCallum to draft a plan of pathological classification of tumours which could be used by hospitals having properly equipped pathological departments, in order that uniform data regarding the incidence of various pathological types of cancer and of the mortality therefrom might be collected. Professor Welsh and Professor MacCallum had exchanged letters on the matter, but as Professor MacCallum had not been able to come to the conference he had appointed Dr. Kaye Scott to act for him. Professor Welsh and Dr. Kaye Scott, in consultation with Dr. Holmes, had accordingly decided upon a scheme of classification of tumours. It consists of: (i) a simple pathological classification of cancer for the use of medical practitioners in filling in medical certificates of death from cancer; (ii) a classification for the use of hospitals which have established special treatment centres for cancer. The classification for hospitals consists of: (a) an anatomical classification, (b) a scheme of pathological classification of tumours.

Copies of these schemes of classification were prepared and circulated to all members of the conference. With one or two minor amendments the conference adopted them.

It was decided that this scheme of classification should be printed, together with an explanatory foreword, in the form of a pamphlet for distribution to hospitals concerned.

It was requested that the simple classification for use in medical certification of deaths be submitted to the Commonwealth Statistician with a recommendation that action be taken with the Government statisticians in each State to substitute this classification for the classification at present in use.

#### An Australian Journal of Cancer.

At the previous Cancer Conference the publication of an Australian Journal of Cancer was discussed; and the conference appointed a committee to draw up the form of material which would be desirable in such a journal.

Professor O. Vonwiller stated that the committee had not prepared a report and he had nothing definite to place before the conference. Some offers of financial support had been received from various quarters, but it did not appear that there was room for a special Australian Journal of Cancer. Suitable provision could be made for publication in existing journals of all research and other work being done in Australia in relation to cancer. He added that it was intended to discontinue publication of *The Journal of the Sydney University Cancer Research Committee* unless a strong or serious request was made by the conference for the continuance of its publication.

The conference accepted the position and made no recommendation.

#### Ephedrine and Tumour Growths.

Dr. N. D. Royle read a paper describing experiments carried out by him in the treatment of malignant and innocent growths in dogs, and indicating particularly the results obtained in the use of ephedrine. He concluded that:

1. Acceleration of the rate of capillary flow leads to an increase in the size of malignant growths.
2. Retardation of the rate of capillary flow leads to decrease in size and in degeneration of malignant growths.
3. Ephedrine is effective in retarding the rate of capillary flow and in causing degeneration of malignant growths.

#### Hormonal Therapy in Cancer.

Dr. E. H. Smalpage addressed the conference on the subject of the treatment of cancer by means of a method of polyvalent hormonal therapy, recently elaborated in Europe. The treatment consisted of a combined extract of various animal organs and glands given by mouth and by intramuscular injection. Dr. Smalpage stated that rigid tests were being carried out at certain clinics in

Europe, and he indicated that he was in collaboration with the workers in Europe who had elaborated the treatment, and that he had supplies of the remedies. He was prepared to make these available to a body appointed by the Cancer Conference, so that a test might be made in Australia of the methods of application of the treatment and of the effects of the treatment.

On the motion of Dr. J. O'Sullivan, seconded by Dr. T. F. Ryan, it was resolved:

That the University of Sydney Cancer Research Committee be asked to appoint a committee to (a) inquire into the matter of the claims placed before the conference by Dr. Smalpage in relation to treatment of cancer; (b) prepare a statement for the next Cancer Conference on biochemical aspects of the treatment of cancer, with special reference to hormonal theories.

#### The Ninth Cancer Conference.

The conference had already decided that the organization of the ninth Cancer Conference, to be held in Sydney, should be placed in the hands of the University of Sydney Cancer Research Committee, together with the representative of the Commonwealth Department of Health. Dr. E. H. Molesworth then moved:

That it be made as a recommendation from this conference to the organizing committee for the ninth Australian Cancer Conference, to be held in Sydney, that at least one half-day of the meeting in Sydney be devoted to papers dealing with biochemical developments relating to cancer.

It was also agreed that the Cancer Research Committee of the University of Sydney should be asked to collect for the next conference all available information dealing with biochemical developments.

Dr. J. O'Sullivan also suggested that it would be more convenient if the conference were to begin on a Wednesday and finish on a Saturday, instead of beginning on a Tuesday and finishing on a Friday. This suggestion was approved.

#### A Form for Use by Radiologists.

Dr. E. W. Frecker informed the conference that at the annual meeting of the Australian and New Zealand Association of Radiology, which had been held on the previous evening, a form had been prepared and approved by the association for the use of radiologists in prescribing and recording treatment by X rays. He threw on to the screen a copy of this form, which, he suggested, might be adopted by the conference to secure uniformity in this respect throughout the Commonwealth.

This suggestion was adopted on the motion of Dr. C. H. de Monchaux, seconded by Dr. S. W. Mason.

It was pointed out that the adoption of this form did not affect the use of the forms for recording radium and X ray treatment at present printed on the uniform case sheets supplied by the Commonwealth Department of Health to all cancer treatment centres in Australia.

#### Votes of Thanks.

The conference closed by according votes of thanks to Sir Colin and Lady MacKenzie for their hospitality, and to Dr. J. H. L. Cumpston and Dr. M. J. Holmes for the work in connexion with the meeting.

#### UNDULANT FEVER IN VICTORIA.

A PROCLAMATION has been issued in the Victoria Government Gazette of July 14, 1937, that, subject to the provisions of the Health Act, 1928, undulant fever has been declared an infectious disease, and a notifiable infectious disease, in the State of Victoria.

#### British Medical Association News.

##### SCIENTIFIC.

A MEETING of the Victorian Branch of the British Medical Association was held at the Victorian Eye and Ear Hospital, Melbourne, on June 16, 1937. The meeting took the form of a series of clinical demonstrations by members of the honorary medical staff.

##### Enucleation of Tonsils in Children.

DR. JEAN LITTLEJOHN demonstrated the technique of tonsil dissections in children. Stress was laid on the importance, when inserting the Davis gag, of making sure that the lips were not pinched by the gag and that the tongue was free of the teeth. The operation was then performed on four children, the method of preserving the pillars intact and the removal of all the lingual extension of lymphoid tissue being demonstrated. During the operations the most likely sites of reactionary hemorrhage were pointed out and the methods of controlling the hemorrhage were described.

##### Chronic Sinusitis.

DR. NOEL BOX showed several patients illustrating various types of sinusitis. Dr. Box emphasized that with the exception of antral disease of dental origin, chronic sinus disease was almost invariably a multisinusitis and very frequently a pansinusitis. He said that in a number of cases the sinusitis was secondary to an allergic state of the perennial hay fever type. Dr. Box also described the methods of investigation used to estimate the nature, extent and degree of sinus involvement. Ventilation and drainage were the essential factors in conservative treatment, and when no gross mucosal changes were present the local application of vaso-constrictor solutions could be tried. Antiseptic or bacteriophage solutions could then be made to enter most of the pneumatic cavities by Beck's postural method. Dr. Box said that when gross hypertrophic changes were shown to be present in the sinuses, operation was indicated, and each affected cavity should be opened and dealt with. A description of the Jansen-Horgan type of operation was given, and it was shown how access could be obtained to all of the sinuses on both sides at the one operation by using this approach. Dr. Box thought that a comparison of the Jansen-Horgan operation with the double radical antrum (Caldwell-Luc) operation revealed but little difference in the operative risk and the period of hospitalization. A coexisting nasal allergy greatly altered the prognosis. He considered that great difficulty would be experienced in determining whether the allergic state of the infection was the prime factor in causing the mucosal change. When gross and widespread changes were present the affected sinuses should be cleared out and the patient referred for allergic treatment. If any doubt existed regarding the importance of the infective factor, the patient should be treated primarily on allergic lines.

##### Ear, Nose and Throat Conditions Commonly Seen in General Practice.

DR. CECIL CANTOR showed several patients exhibiting conditions of the nose and ear which are common in general practice.

The first patient, an adult male, had a right suppurative otitis media of three months' duration and had been treated by his medical practitioner, with little improvement, for two months. Examination showed a meatus containing a quantity of stringy muco-pus. When this was cleaned out the tympanic membrane was seen to be red and thickened, with an antero-inferior perforation through which muco-pus was passing. The other ear was normal.

Anterior rhinoscopy revealed a gross deviation of the septum to the right with almost complete occlusion of the right nasal airway. The pharynx and naso-pharynx were normal. The otitis media was due to a tubo-tympanic infection, which in turn was caused by the gross septal deflection. The treatment indicated was correction of the

septal deformity by submucous resection and inflation of the right Eustachian tube if this was blocked. Restoration of the normal airway and attention to aural toilet would cause the condition to subside.

This case illustrated the importance of complete ear, nose and throat examination of any patient presenting himself with a discharging ear, also the necessity of recognizing the site of the perforation in the drum head. An anterior perforation should always direct attention to the nose, naso-pharynx and sinuses, just as a posterior perforation in the presence of a persistent otorrhoea should direct attention to the aditus, antrum and mastoid, and a superior perforation to the attic region.

The next patient, a boy aged twelve years, again illustrated the necessity for complete examination. His left ear had been discharging for four months, despite intensive aural treatment. Examination revealed stringy mucus in the meatus and a large antero-inferior deficiency in the tympanic membrane. He had a tendency to mouth-breathing, his nose was moist on both sides, with slight oedema of the mucosa of the inferior turbinates. His tonsils had been well removed by the guillotine method three years previously. Posterior rhinoscopy was difficult, but showed the presence of a large adenoid pad. The treatment indicated was curettage of the post-nasal space and aural toilet.

Dr. Cantor said that a summation of all evidence would make one suspect the post-nasal space even though the tonsils had been well removed. It was always extremely important, though often difficult, to examine this area satisfactorily. Familiarity with the handling of a small post-nasal mirror would soon enable one to examine this region in the majority of patients and to gain valuable evidence for the treatment of many obstinate conditions.

Dr. Cantor next showed a patient who had a nasal polypus hanging from the right middle meatus and a right chronic suppurative maxillary sinusitis as proven by repeated antral lavage and X ray examination. The first point demonstrated was the difference in appearance between a polypus and a turbinal. Elementary as it was, quite a number of patients seen by the rhinologist, referred to him for treatment of a nasal polypus, had, on examination, a cystic middle turbinal, an oedematous turbinal, or perhaps a normal though large turbinal bone. The difference in colour, shape, site of origin and sensation to gentle probing was easily recognized after a little practice in rhinological examination.

With regard to the treatment of this condition, the most important factor was to cure the sinusitis. This patient, who had received a dozen lavages with no improvement, who had frank pus in his wash-out and X ray evidence of thickened and polypoid mucosa, could be treated only by the radical operation. The polypus could be snared at the same time, and the ethmoiditis which gave rise to the polypus would probably subside when the antral infection cleared and the middle meatus returned to its normal state. If gross ethmoiditis was present, it would probably be wise to perform the combined radical antrostomy and transantral ethmoidectomy known as the Jansen-Horgan operation.

The next patient shown by Dr. Cantor, as a contrast to the previous patient, was a man with gross bilateral nasal polyposis of such extent that the polypi presented at the nares. This patient was allergic, suffered from asthma, hay fever and urticaria at different times, and X ray examination of his sinus revealed considerable thickening of antral, ethmoidal and frontal sinus mucosa on both sides. Lavage yielded no pus and numerous epithelial threads. The futility of radical operation in the absence of infection was discussed, and also the advisability of carrying out only a local removal of the polypi to clear the nasal airway.

A patient with the moderately rare condition of keratosis pharyngis was then shown by Dr. Cantor. A female, aged forty-seven years, attended the hospital complaining of local discomfort in the throat for six to eight weeks and a feeling "as though she had cobwebs in her throat". Examination of the pharynx revealed unhealthy tonsils with considerable faecal injection. The left tonsil

had on its posterior aspect about a dozen small yellowish projections, discrete and sickle-shaped. About half this number were present on the opposite tonsil. The lateral pharyngeal bands showed two yellowish spots on either side, a commencing keratosis, and on examination of the hypopharynx with a laryngeal mirror the whole lingual tonsil was seen to be covered with small stalactite-like growths. Dr. Cantor explained that the condition was most frequently mistaken for follicular tonsillitis, but in the latter the collections were yellowish-white, amorphous, and easily extruded from the crypts. Keratoses did not coalesce, the surrounding mucosa was not inflamed, and if an attempt was made to remove them they might break off as a cheesy concretion, but the base could not be removed without the epithelium being scraped away and a bleeding surface being left.

Dr. Cantor briefly mentioned the pathology of this interesting condition. It was a cornification of the lacunar epithelium, limited as a rule to Waldeyer's ring, although it might extend from the root of the naso-pharynx down to and into the larynx. The commonest site was the faecal, naso-pharyngeal and lingual tonsil. The aetiology was unknown. Formerly it had been regarded as a mycosis because of the abundance of leptothrix filaments in microscopic sections. These were now regarded as a contamination, as leptothrix was almost constant in tonsillar crypts and tartar of teeth. From the appearance of the tonsils it was evident that proliferation of epithelium might be a reaction to infection and chronic inflammation. It usually spontaneously disappeared after some weeks, although it might last months or years. All local applications were useless. This patient, after a course of general tonic treatment, was to have a tonsillectomy performed.

#### Antral Lavage.

Dr. Cantor then gave a demonstration of the technique of antral lavage. He stressed the following points.

1. Before attempting antral puncture the operator should be able to use a nasal speculum and frontal mirror competently. Considerable discomfort and even pain might be caused by clumsiness with the speculum. Good illumination was essential.

2. An elementary knowledge of intranasal topography was essential. The inferior turbinal and meatus should be visible with ease, and the position of the antro-nasal wall and floor of the orbit ought to be known.

3. Good anaesthesia was important; it should be obtained either by placing a fine wool-coated probe dipped in a 10% solution of cocaine and adrenaline in the inferior meatus and along the antro-nasal wall, or by using an adrenaline-soaked wool carrier dipped in cocaine crystal. If the patient showed an idiosyncrasy to cocaine, "Pantocain", 2%, might be used with equal effect. Ten to twenty minutes of anaesthesia were necessary with the solution, and five to ten minutes with the solid cocaine. If the meatus was small and the turbinal was crowding it, it was advisable to paint the anterior end for a time with cocaine until it opened up.

4. A straight, sharp Lichwitz trocar and cannula were used. Its direction was into the inferior meatus, about the junction of the middle and posterior thirds, fairly high up, near the attachment of the turbinal, and directed outwards to just below the outer canthus of the eye. This precaution was necessary to avoid penetrating the orbital floor.

5. No force was ever necessary for puncture. If the trocar was too far forward, it came in contact with the thick bone of the ascending process of the maxilla; if it was inserted too far posteriorly, it came into contact with the bone, which was again thickened in the region of the pterygoid laminae.

6. The cannula should be free in the antrum and not be placed too close to the posterior wall, or this would interfere with the ease of the fluid flow.

7. Great force should not be used in lavage, and if the ostium was occluded, a second puncture should be made below the first and the cannula should be used for the return of the fluid.

8. When the lavage was being performed the patient should be instructed to hang the head forward, open the mouth and breathe in and out gently. If this was not done, fluid might enter the larynx and cause a coughing spasm.

9. At the end of the lavage with fluid gentle air lavage should be used to remove any remaining fluid.

10. In the early stages of an acute suppurative sinusitis, if pus was draining into the nose through the middle meatus, antral lavage should not be attempted, as the pain caused by irrigation over the acutely inflamed mucosa was agonizing.

#### Demonstration of Gastroscopy and Oesophageal Lesions.

Dr. ERIC GUTTERIDGE demonstrated the causes of dysphagia, with illustrations by enlarged photographs and placards. The illustrations included pharyngeal diverticulum, the Plummer-Vinson syndrome, strictures of the oesophagus due to caustics, cardiospasm, and carcinoma of the post-cricoid region and of the oesophagus.

Dr. Gutteridge also demonstrated a flexible gastroscope, according to Schindler. Two normal patients were examined and the colour and mobility of the normal gastric mucosa could be seen through the instrument.

#### Short Wave Diathermy and Infra-Red Lamp in Sinusitis.

Dr. NOEL BULL demonstrated the use of short wave diathermy and the infra-red lamp in the treatment of sinusitis. He pointed out that the scope of such physical treatment included sinusitis of the acute character following coryzas and chronic muco-purulent sinusitis when there was little or no radiological evidence of any mucosal thickening. It had no place in purulent or polypoid sinusitis or with evidence of a fibrosis of the mucosa. Dr. Bull said that the infra-red lamp was useful in clearing up acute coryzal attacks and that *tinnitus aurium* was occasionally improved by short wave diathermy if it was due to chronic catarrhal *otitis media*.

#### Electrical Aids to Hearing.

Mr. MARCUS TARRANT, a technician, demonstrated electrical hearing aids, their structure and principles. Mr. Tarrant also showed an audiometer of his own manufacture.

#### Pathological Specimens.

Dr. ROY MAYNARD demonstrated a series of pathological specimens, which included gummata and tuberculous lesions of the larynx. He also displayed a fine set of serial sections of the eyeball in health and disease.

## Correspondence.

#### THE SURGICAL TREATMENT OF SPASTIC PARALYSIS.

SIR: Replying to Dr. Royle's letter in the journal of June 26, 1937, I should like to draw his attention to the following points which may not perhaps have occurred to him.

In a normal artery, there is one slope of pressure—downwards towards the capillary bed. In the arteries of the spastic limb during diastole, there are, seemingly, two slopes, one going downwards towards the capillary bed, the other downwards towards the junctions with other vessels. Only a miracle like that described at the Israelites' crossing of the Red Sea could prevent a flow from taking place down both slopes, no matter how abrupt one or the other might be. The vessel, in fact, would empty from both ends. There should be some alteration in the pulse to mark so surprising a phenomenon.

Personally I am still unconvinced that there did exist in Dr. Royle's cases a real difference in diastolic pressure between the spastic limb vessels and the remainder of the arterial tree. I imagine that the peculiar readings were due to defects inherent in the Riva-Rocci method of estimating blood pressure. Our unquestioning belief in the truth of sphygmomanometric terminology would illustrate admirably the meaning of phrases such as "man slave of the machine", for the very defects in the machine we construe as diagnostic virtues. What we call systolic pressure is only the cuff tension necessary to hide the pulse wave from our nose too acute sensorium. Dr. John Hoets, of Sydney, showed this fact in a letter to the journal (February 22, 1936). He says, referring to the pressure necessary to stop the flow of blood from cut arteries: "I was at first surprised to find that bleeding was free when the band was pumped to a pressure even above that suggested by the systolic reading . . . even in children a reading of 200 to 250 is often required to stop the flow."

With regard to the question of capillary circulation, I regret that I must have misread Dr. Royle. I can now see that he meant a current of high linear velocity and low volume through the arterioles. This would, of course, produce a sluggish flow in the capillaries and low oxygen pressure.

Yours, etc.,

WILLIAM P. KELLY.

Brisbane,

July 20, 1937.

#### POLIOMYELITIS.

SIR: In the light of the present relatively high incidence of poliomyelitis in certain districts in Victoria it would seem desirable that some attempt be made in Australia to apply and to pursue further the results of recent research work into the aetiology and prophylactic treatment of infantile paralysis.

During a visit to America in the early part of this year I had the opportunity of spending some days with Dr. Max Minor Peet, Professor of Surgery at the University of Michigan and a member of the American Poliomyelitis Committee, which is appointed by President Roosevelt. Dr. Peet told me that several facts had recently been ascertained concerning the aetiology of infantile paralysis. In the first place the virus of poliomyelitis can cause the disease only if it enters the central nervous system by the olfactory nerves. In monkeys for instance, which are very susceptible to the disease, poliomyelitis virus in concentrated solution cannot cause infection when sprayed into the nasal passages if the olfactory nerves are destroyed or the olfactory tracts cut. Moreover, after destruction of the olfactory nerves intravenous injection of mass doses of poliomyelitis virus does not cause infection. If such intravenous injections are given to monkeys with the olfactory nerves intact one hundred per cent. infection occurs with a very heavy mortality.

At the present time experiments are being carried out by Peet and his co-workers on the prophylactic treatment of poliomyelitis. They have discovered already that certain protein precipitant solutions, such as zinc sulphate, in adequate strengths, if sprayed over the olfactory mucous membrane, will, in monkeys, confer absolute immunity against poliomyelitis infection for a period ranging from one to two months. That this immunity is absolute is indicated by one of their experiments in which, in a series of monkeys after use of a zinc sulphate spray, daily introduction of concentrated poliomyelitis virus into the nasal passages did not cause infection in a single case. This method has already been applied in the last few months as a prophylactic attack against poliomyelitis in several communities in the south-eastern States of America; and although it is far too early yet to evaluate its results, those who have been associated with the original work which led to its use are convinced of its efficacy.

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The method is simple, inexpensive, and is not followed by any reaction other than slight discomfort immediately succeeding the insufflation and some nasal congestion for one or two days.

I bring this matter to your notice, as I know you will agree with me that information, of such particular interest to the medical profession and to the community generally, issuing from so reliable a source as Dr. Peet should be disseminated in Australia as soon as possible.

Yours, etc.,

GILBERT PHILLIPS,  
Lecturer in Surgery, Sydney University.

Department of Surgery,  
University of Sydney,  
July 29, 1937.

## Post-Graduate Work.

### INFORMATION BUREAU FOR MEDICAL PRACTITIONERS VISITING GERMANY.

We are advised that a bureau of general information for medical practitioners has been established in connexion with the *Berliner Akademie für ärztliche Fortbildung*. Medical men intending to visit Germany are invited to communicate with this information bureau, which will gratuitously answer all questions, assist in planning the most profitable utilization of available time, and, if necessary, provide letters of introduction to clinics, institutes *et cetera* in Berlin and in other parts of Germany. The address of the Information Bureau is: Kaiserin Friedrich-Haus, Berlin NW 7, Robert Koch-Platz 7.

## Obituary.

### GEORGE WILLIAM FREDERICK PAUL.

A MEDICAL PRACTITIONER who wishes to remain anonymous has written the following appreciation of the late Dr. George William Frederick Paul.

On the high seas off Fremantle on March 19, 1937, the death of Dr. George William Frederick Paul occurred suddenly, and in the way he himself always wished such to happen, namely, whilst still in active practice. He graduated in London at the age of twenty-one, and gained the M.D. at Brussels before returning to Australia to commence private practice at Sandgate and Townsville, and then at Cobar in New South Wales. In 1913 he returned to Queensland and continued in general practice at Kangaroo Point until his death. He also acted as medical officer of health to the South Brisbane City Council until 1921, and for the past three years as medical officer of health to the Brisbane City Council. It was whilst holding the latter position he initiated the campaign for immunization against diphtheria. His natural bonhomie and unfailing kindness and courtesy secured for him a host of friends, and these traits, combined with his untiring energy, enabled him to build up and carry on successfully a large general practice. His chief interests outside his practice centred in music and in chess, at which latter game he was one of this State's leading players for several years.

### JOHN MACMASTER.

We regret to announce the death of Dr. John MacMaster, which occurred on July 31, 1937, at Neutral Bay, New South Wales.

## Congress Notes.

### AUSTRALASIAN MEDICAL CONGRESS (BRITISH MEDICAL ASSOCIATION).

THE Joint Honorary Secretaries of the fifth session of the Australasian Medical Congress (British Medical Association), to be held at Adelaide on August 23 to 28, 1937, advise that the South Australian Railways have agreed to deliver to the various city hotels the luggage of members of Congress arriving in Adelaide from Melbourne on the mornings of August 22 and 23. Arrangements will be made for the luggage porter to interview members on the train each day prior to their arrival in Adelaide. The expenses of delivery will be met from Congress funds.

## Proceedings of the Australian Medical Boards.

### NEW SOUTH WALES.

THE undermentioned have been registered, pursuant to the provisions of the *Medical Act*, 1912 and 1915, of New South Wales, as duly qualified medical practitioners:

Schlink, Franziska, M.B., B.S., 1932 (Univ. Melbourne), Broken Hill Hospital, Broken Hill.  
Brosnan, Gerald, M.B., B.S., 1935 (Univ. Melbourne), Wagga District Hospital, Wagga.  
Hayes, Patrick Govan, M.B., B.S., 1937 (Univ. Melbourne), Wagga District Hospital, Wagga.  
Smylie, James, M.B., B.S., 1935 (Univ. Melbourne), 50, Hopetoun Road, Toorak, S.E.2, Victoria.  
Cummings, Enid Gwendoline Myra, M.R.C.S., 1933 (England), L.R.C.P., 1933 (London), Prospect Street, West Kogarah.  
Constable, Roy Keith, M.B., B.S., 1937 (Univ. Sydney), Royal North Shore Hospital of Sydney, St. Leonards.  
Marr, James Scott, M.R.C.S., 1933 (England), L.R.C.P., 1933 (London), Head Office, Bank of New South Wales, Sydney.  
Peters, Sheila Rosa, M.B., B.S., 1933 (Univ. Melbourne), Lisgar Street, Junee.

## NOTICE.

### The Sir Herbert Maitland Oration.

THE second Sir Herbert Maitland Oration will be delivered to the Old Sydney Hospitalers' Club by Sir Raphael Cilento at the Sydney Hospital on the evening of August 26, 1937. A limited number of invitations is available. Members of the medical profession who desire to be present should communicate as soon as possible with the Honorary Secretary of the club, 145 Macquarie Street, Sydney.

### THE ISOBEL BROWN MEMORIAL.

In memory of Dr. Isobel Brown, and at the suggestion of several of her friends, a committee has been formed to establish a permanent memorial to her in connexion with the Rachel Forster Hospital. It is hoped that this will take the form of a room for sick nurses or resident medical officers.

The Honorary Treasurer of the Royal Prince Alfred Hospital, Dr. E. M. Day, has received additional subscriptions from the following: Dr. H. Biffin, Dr. M. Burfitt, Dr. H. Evans, Dr. A. W. Morrow, Mrs. L. Slater, Sir John McKelvey.

The fund now totals £160.

### Books Received.

**THE DIABETIC LIFE: ITS CONTROL BY DIET AND INSULIN. A CONCISE PRACTICAL MANUAL FOR PRACTITIONERS AND PATIENTS,** by R. D. Lawrence, M.A., M.D., F.R.C.P.; Tenth Edition; 1937. London: J. and A. Churchill Limited. Large crown 8vo, pp. 256, with 18 illustrations. Price: 8s. 6d. net.

**MANUAL OF PRACTICAL ANATOMY,** by J. E. Fraser, D.Sc., F.R.C.S., and R. H. Robbins, M.A., M.D.; Volume I: Upper Limb, Lower Limb and Abdomen; 1937. London: Ballière, Tindall and Cox. Large crown 8vo, pp. 546, with illustrations. Price: 10s. 6d. net.

### Diary for the Month.

AUG. 10.—New South Wales Branch, B.M.A.: Executive and Finance Committee.  
 AUG. 10.—Tasmanian Branch, B.M.A.: Branch.  
 AUG. 12.—Queensland Branch, B.M.A.: Council.  
 AUG. 17.—Tasmanian Branch, B.M.A.: Council.  
 AUG. 17.—New South Wales Branch, B.M.A.: Ethics Committee.  
 AUG. 18.—Western Australian Branch, B.M.A.: Branch.  
 AUG. 19.—New South Wales Branch, B.M.A.: Clinical meeting.  
 AUG. 23.—Australasian Medical Congress (B.M.A.): Fifth Session opens at Adelaide.  
 AUG. 24.—New South Wales Branch, B.M.A.: Medical Politics Committee.  
 AUG. 25.—Victorian Branch, B.M.A.: Council.  
 AUG. 26.—South Australian Branch, B.M.A.: Branch.  
 AUG. 27.—Queensland Branch, B.M.A.: Council.

### Medical Appointments.

Dr. J. Piccles has been appointed Medical Officer of Health at Carnarvon, Western Australia.

Dr. G. J. Cuthbert has been appointed Director of Maternal and Baby Welfare in the Office of the Director-General of Public Health of New South Wales.

Dr. W. A. Bossence has been appointed, pursuant to the provisions of the *Workers' Compensation Acts*, a Certifying Medical Practitioner at Kyabram, Victoria.

Dr. J. N. Morris and Dr. J. L. Thompson have been appointed Members of the Charities Board of Victoria, under the provisions of the *Hospitals and Charities Act*, 1928, of Victoria.

The following appointments have been made at the Parkside Mental Hospital, South Australia: Dr. O. M. Moulden, Honorary Gynaecologist; Dr. E. A. Matison, Honorary Surgeon of the Ear, Nose and Throat Section; Dr. L. W. Linn, Honorary Dermatologist.

### Medical Appointments Vacant, etc.

For announcements of medical appointments vacant, assistants, locum tenentes sought, etc., see "Advertiser", pages xxiv to xxvi.

**ARAMAC HOSPITAL, ARAMAC, QUEENSLAND:** Medical Officer.  
**CANBERRA COMMUNITY HOSPITAL, CANBERRA, F.C.T.:** Medical Superintendent.  
**INNISFAIL HOSPITALS BOARD, INNISFAIL, QUEENSLAND:** Assistant Medical Officer.  
**MOOROOPNA HOSPITAL, MOOROOPNA, VICTORIA:** Resident Medical Officers.  
**NEW SOUTH WALES MEDICAL DEFENCE UNION, LIMITED, SYDNEY, NEW SOUTH WALES:** Assistant Secretary.  
**ROYAL HOSPITAL FOR WOMEN, PADDINGTON, NEW SOUTH WALES:** Junior Resident Medical Officer.  
**THE RACHEL FORSTER HOSPITAL, FOR WOMEN AND CHILDREN, SYDNEY, NEW SOUTH WALES:** Honorary Anæsthetist.  
**WESTERN AUSTRALIAN PUBLIC SERVICE:** Assistant Medical Officer.

### Medical Appointments: Important Notice.

MEDICAL PRACTITIONERS are requested not to apply for any appointment referred to in the following table without having first communicated with the Honorary Secretary of the Branch named in the first column, or with the Medical Secretary of the British Medical Association, Tavistock Square, London, W.C.1.

BRANCHES.	APPOINTMENTS.
<b>NEW SOUTH WALES:</b> Honorary Secretary, 135, Macquarie Street, Sydney.	Australian Natives' Association. Ashfield and District United Friendly Societies' Dispensary. Balmain United Friendly Societies' Dispensary. Leichhardt and Petersham United Friendly Societies' Dispensary. Manchester Unity Medical and Dispensing Institute, Oxford Street, Sydney. North Sydney Friendly Societies' Dispensary Limited. People's Prudential Assurance Company Limited. Phoenix Mutual Provident Society.
<b>VICTORIAN:</b> Honorary Secretary, Medical Society Hall, East Melbourne.	All Institutes or Medical Dispensaries. Australian Prudential Association, Proprietary, Limited. Mutual National Provident Club. National Provident Association. Hospital or other appointments outside Victoria.
<b>QUEENSLAND:</b> Honorary Secretary, B.M.A. House, 225, Wickham Terrace, Brisbane, B.17.	Brisbane Associate Friendly Societies' Medical Institute. Prosperine District Hospital. Members accepting LODGE appointments and those desiring to accept appointments to any COUNTRY Hospital are advised, in their own interests, to submit a copy of their Agreement to the Council before signing.
<b>SOUTH AUSTRALIAN:</b> Secretary, 178, North Terrace, Adelaide.	All Lodge appointments in South Australia. All contract Practice Appointments in South Australia.
<b>WESTERN AUSTRALIAN:</b> Honorary Secretary, 205, Saint George's Terrace, Perth.	All Contract Practice Appointments in Western Australia.

### Editorial Notices.

MANUSCRIPTS forwarded to the office of this journal cannot under any circumstances be returned. Original articles forwarded for publication are understood to be offered to THE MEDICAL JOURNAL OF AUSTRALIA alone, unless the contrary be stated.

All communications should be addressed to the Editor, THE MEDICAL JOURNAL OF AUSTRALIA, The Printing House, Seamer Street, Glebe, New South Wales. (Telephones: MW 2651-2.)

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